BLM LIBRARY
88013467

LAS CRUCES / LORDSBURG RESOURCE AREA

DRAFT

Management Framework Plan Amendment

Environmental Impact Statement

Isabel Diaz

MARCH 1983

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE

NOTICE

THIS DRAFT MANAGEMENT FRAMEWORK PLAN AMENDMENT/ ENVIRONMENTAL IMPACT STATEMENT (MFP AMENDMENT/EIS) SHOULD BE RETAINED TO BE USED IN CONJUNCTION WITH THE FINAL MFP AMENDMENT/EIS. IF CHANGES RESULTING FROM PUBLIC REVIEW AND COMMENT ON THIS DRAFT ARE RELATIVELY MINOR, THE FINAL STATEMENT WILL NOT REPRODUCE THE DRAFT TEXT IN FULL; HOWEVER, THE FINAL STATEMENT WILL INCLUDE THE MODIFICATIONS AND CORRECTIONS WHICH SHOULD BE MADE TO THIS DRAFT AS A RESULT OF PUBLIC COMMENT, AS WELL AS A RECORD OF PUBLIC COMMENTS ON THIS DRAFT AND THE RESPONSES TO THOSE COMMENTS.

88013467

LASC
.78
DES

SF
85.35
.N6
L67
1983

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

DRAFT

MANAGEMENT FRAMEWORK PLAN AMENDMENT
ENVIRONMENTAL IMPACT STATEMENT
ON
ENERGY MINERALS LEASING AND RANGELAND MANAGEMENT IN THE LAS CRUCES/LORDSBURG RESOURCE AREA

Abstract: The Bureau of Land Management proposes to reconsider constraints on energy minerals leasing imposed by existing decisions for the Las Cruces/Lordsburg Resource Area (Dona Ana, Luna, Hidalgo, and Grant Counties) and to implement a rangeland management program for the 3-County Area (Luna, Hidalgo, and Grant Counties) of the Las Cruces District in southwestern New Mexico. The Energy Minerals issue involves the identification and analysis of areas where potential resource conflicts would be significant enough to either preclude or restrict oil and gas or geothermal leasing and associated operations. The Rangeland Management issue involves the amount of vegetation allocated to grazing and other uses; the methods of grazing management, support facilities, monitoring and evaluation, and maintenance of rangeland developments. Under each issue, general implementation is outlined and standard operating procedures are discussed. Interrelationships with other agencies in the Resource Area are also discussed. A Proposed Action and four alternatives (No Action, Maximization of Energy Minerals Leasing and Livestock Forage Production, Enhancement of Other Resource Values and Elimination of Livestock Grazing) are considered. A discussion of the affected environment is briefly summarized, and the environmental consequences which would result from implementation of the Proposed Action and each alternative are analyzed in this Management Framework Plan Amendment/Environmental Impact Statement.

Type of Action: (x) Administrative ( ) Legislative

Contact for this EIS: Mary Austin
BLM, Las Cruces District Office
317 N. Main
P. O. Box 1420
Las Cruces, New Mexico 88004
Phone: Commercial: (505) 524-8551
FTS: 571-8312

Comments have been requested from: See Chapter 4.

Date Draft Filed with EPA: MAR 8 1983

Dates of Comment/Review Period: March 18 - June 16 1983

Approved:
Daniel C. B. Rathbun
District Manager
Las Cruces District Office
Las Cruces, New Mexico

I Concur:
Charles W. Luscher
State Director, New Mexico

Bureau of Land Management
Library
Bldg 50 Denver Federal Center
Denver, CO 80225

TABLE OF CONTENTS

Page

SUMMARY xi

CHAPTER ONE - PROPOSED ACTION AND ALTERNATIVES

Introduction 1-1
Management Framework Plan (MFP) Amendment Process 1-3
Conformance 1-5
Description of Proposed Action and Alternatives 1-6
Authorizing Actions 1-37
Interrelationships 1-38
Impacts 1-42

CHAPTER TWO - AFFECTED ENVIRONMENT

Introduction 2-1
Physical Setting 2-1
Vegetation 2-3
Soils 2-12
Wildlife 2-14
Geology and Mineral Resources 2-23
Livestock Grazing 2-27
Water Resources 2-29
Air Quality 2-38
Cultural Resources 2-38
Visual Resources 2-43
Recreation 2-45
Existing Area of Critical Environmental Concern (ACEC) . . . 2-47
Wilderness 2-48
Other Land Uses 2-50
Social Conditions 2-51
Economic Conditions 2-57

CHAPTER THREE - ENVIRONMENTAL CONSEQUENCES

Introduction 3-1
Assessment of Impacts 3-4
Vegetation
Energy Minerals 3-4
Rangeland Management 3-4
Proposed Special Designation Areas 3-20
Soils
Energy Minerals 3-20
Rangeland Management 3-21
Wildlife
Energy Minerals 3-24
Rangeland Management 3-29
Proposed Special Designation Areas 3-42
Geology and Mineral Resources
Energy Minerals 3-43
Proposed Special Designation Areas 3-44

Page

Livestock Grazing

Energy Minerals 3-44
Rangeland Management 3-44
Proposed Special Designation Areas 3-49

Water Resources

Energy Minerals 3-49
Rangeland Management 3-52
Proposed Special Designation Areas 3-57

Air Quality

Energy Minerals 3-58
Rangeland Management 3-58

Cultural Resources

Energy Minerals 3-59
Rangeland Management 3-62
Proposed Special Designation Areas 3-64

Visual Resources

Energy Minerals 3-65
Rangeland Management 3-65
Proposed Special Designation Areas 3-67

Recreation

Energy Minerals 3-68
Rangeland Management 3-70
Proposed Special Designation Areas 3-73

Existing Area of Critical Environmental Concern

Energy Minerals 3-74

Wilderness

Energy Minerals 3-75
Rangeland Management 3-75
Proposed Special Designation Areas 3-76

Other Land Uses

Energy Minerals 3-77

Social Conditions

Energy Minerals 3-78
Rangeland Management 3-81

Economic Conditions

Energy Minerals 3-88
Rangeland Management 3-92
Proposed Special Designation Areas 3-99

CHAPTER FOUR - CONSULTATION AND COORDINATION

Introduction 4-1
Public Consultation, Agency Coordination, and Scoping Activities 4-1
Public Review of the Draft MFP Amendment/EIS 4-8
Alternatives Considered But Not Analyzed 4-10
Hearings 4-10

TABLES

1-1 Mineral Ownership Las Cruces/Lordsburg Resource Area. . 1-1
1-2 Status of Energy Minerals Leasing by Alternative . . . 1-8

Page

1-3 Surface Disturbance on Public Land by Energy Minerals Activities--Short-Term 1980 to 1994 1-10
1-4 Surface Disturbance on Public Land by Energy Minerals Activities--Long-Term 1980 to 2010 1-11
1-5 Summary of Existing Allotment Status, Acreage, and AUM Allocations 1-17
1-6 Proposed Forage Allocations by Alternatives 1-18
1-7 Summary of Proposed Vegetation Treatments on Public Land--Proposed Action and Enhancement of Other Resource Values Alternative 1-24
1-8 Summary of Proposed Vegetation Treatments on Public Land--Maximization of Livestock Forage Production Alternative 1-33
1-9 Additional Rangeland Developments and Grazing Adjustments Under the Enhancement of Other Resource Values Alternative 1-36
1-10 Summary of Impacts 1-43
2-1 Average Monthly and Annual Precipitation 2-2
2-2 Public Land Acres and Percent For Ecological Condition and Forage Value Class by Range Site . . . 2-4
2-3 Average Vegetative Production by Range Site 2-6
2-4 Acres of Public Land and Percent by Vegetative Subtype. 2-8
2-5 Summary of Public Land Acres and Percent by Range Site and Major Vegetative Type 2-9
2-6 Range Site by Erosion Condition Class 2-14
2-7 Standard Habitat Sites Comparison Data 2-15
2-8 Game Use of Standard Habitat Sites 2-16
2-9 Nesting Bird Ratios 2-17
2-10 Special Habitat Features 2-19
2-11 Federal and State Endangered Species With Their Preferred Wildlife Habitat 2-24
2-12 Magnitude of Flood Runoff Events in the Las Cruces/ Lordsburg Resource Area 2-31
2-13 Cultural Resource Surveys 2-39
2-14 Cultural Periods and Resource Affiliation in the Las Cruces/Lordsburg Resource Area 2-40
2-15 Correlation Between Vegetation Types and Site Types . . 2-41
2-16 Physical Condition of Cultural Sites in the Resource Area 2-42
2-17 Wilderness Study Areas - Las Cruces/Lordsburg Resource Area 2-49
2-18 Population Counts for the Las Cruces/Lordsburg Resource Area by County, 1950-1980 2-51
2-19 Population Counts by Racial and Ethnic Groups Las Cruces/Lordsburg Resource Area, 1980 2-52
2-20 Estimated Total Dollar Output for 35 Industries 2-58
2-21 Estimated Income and Employment for the Las Cruces/ Lordsburg Resource Area, 1980 2-59
2-22 Total Personal Income and Per Capita Income by County, 1980 2-61
2-23 Per Capita Personal Income, Selected Western States, 1980 2-61

Page

2-24 Estimated Costs and Returns for Representative Ranch Operations in the 3-County Area, 1980 2-62
3-1 Summary of Projected Public Land Acres Changes by Ecological Condition and Forage Value Class by Alternative 3-5
3-2 Projected Public Land Acres by Range Site for Each Ecological Condition and Forage Value Class (Proposed Action) 3-7
3-3 Vegetative Ground Cover and Vegetation Treatments by Range Site for Each Alternative 3-8
3-4 Projected Public Land Acres by Range Site for Each Ecological Condition and Forage Value Class (No Action Alternative) 3-12
3-5 Projected Public Land Acres by Range Site for Each Ecological Condition and Forage Value Class (Maximization of Livestock Forage Production Alternative) 3-15
3-6 Projected Public Land Acres by Range Site for Each Ecological Condition and Forage Value Class (Enhancement of Other Resource Value Alternative) . . 3-17
3-7 Projected Public Land Acres by Range Site for Each Ecological Condition and Forage Value Class (Elimination of Livestock Grazing Alternative) . . . 3-19
3-8 Comparison of Ecological Condition Classes Within Standard Habitat Sites 3-30
3-9 2010 Projected Populations - Big Game Herds 3-33
3-10 Acres Proposed for Vegetation Treatment by Standard Habitat Site 3-39
3-11 Predicted Cultural Sites Impacted by the Proposed Action and MAX Alternative 3-63
3-12 Estimated Annual Costs and Returns For All Ranch Operations by Alternative For the 3-County Area . . . 3-93
4-1 List of Preparers 4-2
4-2 Scoping Activities Las Cruces/Lordsburg RMP 4-5
4-3 Summary of Consultation, Coordination, and Scoping Activities 4-6

ILLUSTRATIONS

The following oversize visuals are located in the map pocket.

Visual

A Land Status in the Resource Area

Overlays

1 Allotment Boundaries
2 Existing Situation for Energy Mineral Leasing
3 Proposed Situation for Energy Mineral Leasing

Page

Maps

1-1 General Location Map 1-2
1-2 Vegetation Treatment Areas (PA and EORV Alternatives) . . . . Follows 1-24
1-3 Vegetation Treatment Areas (MAX Alternative). . Follows 1-34
2-1 Big Game Population Areas . . . . Follows 2-15
2-2 Areas with Energy Minerals Potential . . . . Follows 2-26
2-3 Surface-Water Basins 2-30
2-4 Estimated Potential Yield of Water Wells 2-34
2-5 General Depth to Groundwater 2-35
2-6 Declared Underground Water Basins 2-37
2-7 Cultural Resources . . . . Follows 2-39
2-8 Visual Resource and Areas Under Wilderness Review . . . . Follows 2-43

Figures

1-1 Forage Allocation Under Proposed Action 1-19
1-2 Forage Allocation Under No Action Alternative 1-19
1-3 Forage Allocation Under Elimination Of Livestock Grazing Alternative 1-19
1-4 Forage Allocation Under Maximization of Livestock Forage Production Alternative 1-19
1-5 Forage Allocation Under Enhancement of Other Resource Values Alternative 1-19
3-1 Comparison of Summer Bird Diversities and Plant Diversities by Standard Habitat Site 3-31

APPENDICES

A Rangeland Consultation Policy A-1
B Vegetation
  B-1 Guidelines for Vegetation Treatments B-1
  B-2 Methodology - Modified Soil-Vegetation Inventory and Digitizing B-7
  B-3 Methodology - Forage Value Class B-9
  B-4 Methodology - Ecological Condition Class . . . B-11
  B-5 Methodology - Apparent Trend B-12
  B-6 Methodology - Determination of the Estimated Acre Changes for Each Ecological Condition and Forage Value Class and Ground Cover Changes By Alternative B-14
  B-7 Major Plant Species Identified in Hidalgo, Luna, Grant, and Part of Cochise Counties . . B-16
  B-8 Average Air Dry Production and Plant Composition by Range Site B-19
  B-9 Public Land Acres and Percent By Vegetative Subtype and Range Site B-25
  B-10 Poison Plants Identified in Hidalgo, Luna, Grant, and Part of Cochise Counties B-26

Page

B-11 Threatened, Endangered, and Sensitive Plant Species Potentially Occurring on Public Land in the Las Cruces/Lordsburg Resource Area . . B-28

C Soils
- C-1 Series and Classification of Soils in the 3-County Area C-1
- C-2 PSIAC Methodology for Calculating Sediment Yield C-3
- C-3 Wind Erodibility Groups (WEGs) C-6

D Wildlife
- D-1 Methodology - Wildlife D-1
- D-2 Correspondence Concerning Section 7 Consultation with the U.S. Fish and Wildlife Service . . . D-6
- D-3 Wildlife Species List for the Las Cruces/ Lordsburg Resource Area D-19

E Mineral Resources
- E-1 Stipulations For Areas of Concern E-1
- E-2 Methodology - Energy Minerals Assumptions . . . E-16

F Livestock Grazing
- F-1 Acreage and Forage Allocation By Allotment . . F-1
- F-2 Proposed Management Categories By Allotment . . F-6
- F-3 Criteria Used For Categorizing I, M, and C Allotments F-9
- F-4 Proposed Rangeland Developments (Proposed Action and Enhancement of Other Resource Values Alternative) F-10
- F-5 Proposed Rangeland Developments (Maximization of Livestock Forage Production Alternative) . F-13
- F-6 Categorization and Present Acres in Each Ecological Condition Class by Allotment . . . F-19

G Water Resources
- G-1 Methodology - Surface Runoff G-1
- G-2 Water Quality Criteria for Livestock and Wildlife Use G-2
- G-3 State Water Quality Standards - Rio Grande Basin, Gila River Basin, and Mimbres River Basin . . G-3
- G-4 Water Quality Standards for Ground Water of 10,000 mg/l TDS Concentration or Less G-6

H Cultural Resources
- H-1 Letters of Consultation with the State Historic Preservation Officer H-1

I Visual Resources
- I-1 Visual Resources Inventory and Evaluation Process I-1

J Recreation
- J-1 Methodology for Determining Hunter Visitor Hours J-1

K Economic Conditions
- K-1 Methodology - Las Cruces/Lordsburg Input-Output Model K-1
- K-2 Methodology for Developing Ranch Budgets for the 3-County Area K-2

K-3 Estimated Costs and Returns for Individual Ranch Size Categories in the 3-County Area - Subsistence, Small, Medium, and Large K-4
K-4 Estimated Costs and Returns for Ranch Size Categories by Alternative in the 3-County Area K-16
K-5 Linear Analysis Methodology K-17

GLOSSARY GL-1

REFERENCES R-1

INDEX IN-1

TECHNICAL REPORTS

(Technical Reports are available for review at the Las Cruces District Office.)

I Development of Issues and Planning Criteria Process for the Las Cruces/Lordsburg Resource Area

II Energy Minerals
  - Environmental Review Process for Leasing and Exploration
  - Sources for Standard Operating Procedures
  - Legal Descriptions of Areas with Special Stipulations
  - Calculations by Alternative for NOL Acreages and Acres to be Leased with Special Stipulations

III ACEC Management Plans
  - Gila Lower Box Riparian Area
  - Gila Middle Box Wildlife Area
  - Organ Mountains Scenic Area

IV Memorandum of Understanding
  - New Mexico Department of Game & Fish and BLM
  - State Historic Preservation Officer, Advisory Council on Historic Preservation, and BLM

V Physical Setting
  - General Locations of Weather Stations

VI Vegetation
  - Utilization Criteria for Important Forage Species
  - Phenology of Important Forage Species in the LCLRA
  - USDA Compilation of Registered Used of Herbicides

VII Soils
  - Physical and Chemical Parameters
  - Wind Erodibility Groups (WEGs)

VIII Livestock Grazing
  - Present and Proposed Allocations by Land Ownership
  - Allocation of Grazing Use (Dichotomous Key and Consultation Procedures for I, M, and C allotments)

IX Water Resources
  - Water Quality of Selected Streams in the LCLRA
  - Water Quality of the Gila River Near Red Rock, New Mexico
  - Water Quality of Selected Wells in the LCLRA

X Economic Conditions
  - Detailed Methodology for Developing the Ranch Budgets for Each Ranch Size Category
  - Detailed Methodology for Las Cruces/Lordsburg Input-Output Model
  - Detailed Methodology for Linear Analysis

SUMMARY

SUMMARY

INTRODUCTION

The Bureau of Land Management (BLM) Las Cruces District proposes to resolve resource conflicts involving energy minerals leasing on 3.8 million acres of BLM administered subsurface estate and to implement a rangeland management program on 1,624,090 acres of public land within the Las Cruces/Lordsburg Resource Area (see Map 1-1). For the Energy Minerals issue, the entire Las Cruces/Lordsburg Resource Area is under consideration. Short-term impacts are those which occur from 1980 to 1994. Long-term impacts are those which occur between 1980 and 2010. For the rangeland management issue, the area for consideration will be Hidalgo, Grant, and Luna Counties in New Mexico and a small portion of Cochise County in Arizona. For the rangeland management issue, short-term impacts are those which would occur within 9 years after implementation. Long-term impacts are those that would still exist by the year 2010. The Proposed Action and four alternatives have been developed to arrive at an acceptable amendment to existing plans for the Resource Area.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action (PA)

The Proposed Action is the preferred alternative. The PA includes the following major components.

-A total of 3,132,031 acres would be open to energy minerals leasing with no special stipulations; 675,894 acres would be open with special stipulations; and 9,836 acres would not be open to leasing (NOL).

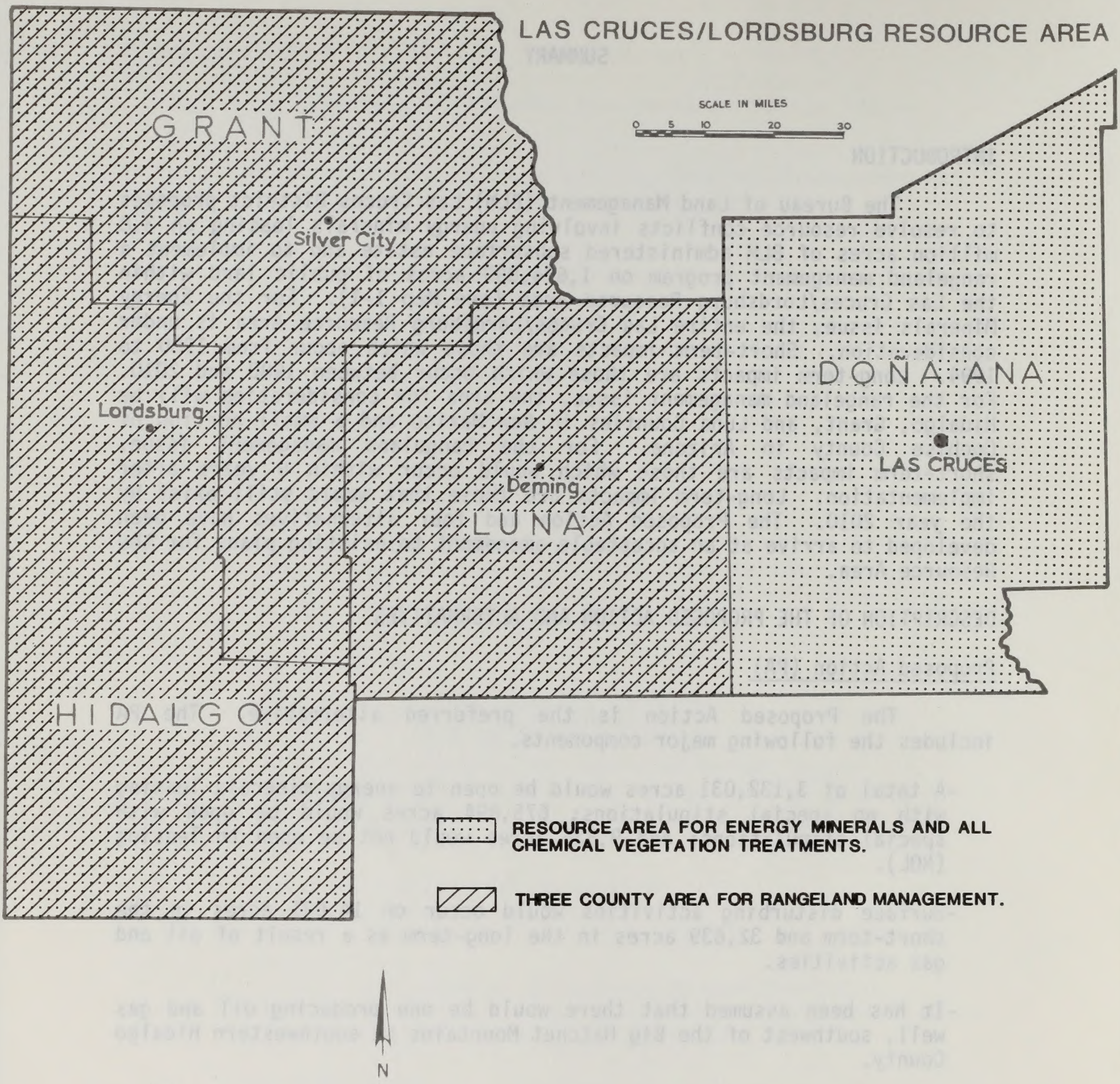
-Surface disturbing activities would occur on 14,631 acres in the short-term and 32,639 acres in the long-term as a result of oil and gas activities.

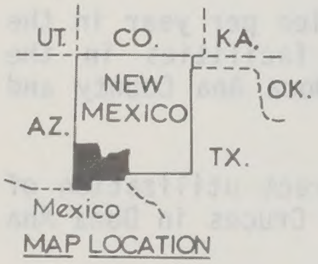
-It has been assumed that there would be one producing oil and gas well, southwest of the Big Hatchet Mountains in southwestern Hidalgo County.

-Drilling of five shallow temperature gradient holes per year in the short-term and three deep wells with related facilities in the long-term are anticipated on the East Mesa in Dona Ana County and other areas with favorable geothermal potential.

-It has been assumed that there would be one direct utilization of geothermal energy for greenhouse use east of Las Cruces in Dona Ana County in the long-term.

-The initial livestock forage allocation would be mutually agreed upon between the permittees and BLM and could be up to preference


LAS CRUCES/LORDSBURG RESOURCE AREA
SCALE IN MILES
0
5
10
20
30
GRANT
Silver City
Lordsburg
Deming
LUNA
DOÑA ANA
LAS CRUCES
HIDALGO
RESOURCE AREA FOR ENERGY MINERALS AND ALL CHEMICAL VEGETATION TREATMENTS.
THREE COUNTY AREA FOR RANGELAND MANAGEMENT.
N


UT.
CO.
KA.
NEW MEXICO
OK.
AZ.
TX.
Mexico

MAP LOCATION

MAP 1-1

GENERAL LOCATION MAP

LAS CRUCES/LORDSBURG RESOURCE AREA

SOURCE: BLM Las Cruces District Files 1982

(264,244 animal unit months [AUMs]). If monitoring studies show a need for adjustments in livestock numbers, decisions would be issued stating what the adjustments would be.

- Under the worst case situation in the short-term, a lower level of grazing use on Category I allotments of approximately 213,286 AUMs for livestock would be analyzed. The initial allocation for big game would be 1,917 AUMs.

- In the long-term, 257,402 AUMs of forage would be available for livestock and 3,498 AUMs for big game.

- Three levels of grazing management would be implemented. On 164 allotments, current satisfactory condition would be maintained (Category M); 17 allotments would be managed in a custodial manner while protecting existing resources (Category C); and management and rangeland improvement efforts would be concentrated on 71 allotments that have potential for improvement and where resource conflicts exist (Category I). Ten allotments are split among the three categories.

- Activity plans would be prepared to resolve conflicts on allotments with riparian areas, proposed areas of critical environmental concern (ACECs), crucial deer, pronghorn, ibex, and bighorn sheep habitat as well as areas where threatened or endangered plant or animal species are known to occur.

- Proposed rangeland developments include construction of 25 dirt tanks, 67 miles of pipeline, 47 drinking troughs, drilling or equipping 11 wells, 1 cattleguard, 17 storage tanks, 68 erosion dikes, 55 miles of fence, and 4 umbrella catchments. Chemical vegetation treatments would be implemented on 9,609 acres of mesquite and 42,279 acres of creosote.

- Category I allotments would be monitored to determine the livestock grazing capacity and the effectiveness of grazing treatments, vegetation treatments, and rangeland developments.

- Priority has been given to the identification, proposed designation, protection, and special management proposals for three ACECs: the Gila River Lower Box Riparian Area, the Gila River Middle Box Wildlife Area, and the Organ Mountains Scenic Area.

No Action (NA) Alternative

The NA Alternative includes the following major components.

- Currently, 3,144,624 acres are open to energy minerals leasing with no special stipulations; 564,677 acres are open with special stipulations; and 108,460 acres are designated NOL.

- Existing forage allocations would be maintained at the present preference of 264,244 AUMs for livestock and 2,154 AUMs for wildlife.

-Fifteen allotments with existing Allotment Management Plans (AMPs) would be managed intensively and monitored.

-No new Bureau initiated rangeland developments or vegetation treatments would be implemented in direct support of the grazing program. Range Betterment Funds presently used for rangeland developments would continue to be expended.

Maximization (MAX) of Energy Minerals Leasing and Livestock Forage Production Alternative

The MAX Alternative includes the following major components.

-A total of 3,817,761 acres of Federal mineral estate would be open to energy minerals leasing with no special restrictions or stipulations.

-An intensive program of rangeland management designed to achieve maximum forage production for livestock would be initiated. Categorization of allotments would be the same as the PA.

-Chemical vegetation treatments would be implemented on 412,951 acres of mesquite and 462,816 acres of creosote. Mechanical vegetation treatments on 5,230 acres of creosote, mixed desert shrub, and tarbush also would be implemented.

-Proposed rangeland developments include construction of 49 dirt tanks, 224 miles of pipeline, 145 drinking troughs, drilling and equipping 46 wells, 4 cattleguards, 48 storage tanks, 94 erosion dikes, and 4 umbrella catchments.

-Initial stocking rates and needed adjustments would be the same as under the PA.

-Under the worst case situation in the short-term, a lower level of grazing use on Category I allotments of approximately 213,286 AUMs for livestock would be analyzed. An initial allocation of 1,917 AUMs for big game also would be analyzed.

-In the long-term, 297,765 AUMs of forage would be available for livestock and 3,512 AUMs for big game.

Enhancement of Other Resource Values (EORV) Alternative

The EORV Alternative includes the following major components.

-A total of 3,119,887 acres would be open to energy minerals leasing with no special restrictions or stipulations; 680,914 acres would be open with special stipulations; and 16,960 acres would be NOL.

-Initial stocking rates and needed adjustments would be the same as under the PA.

-Under the worst case situation in the short-term, livestock grazing would be reduced 50 percent from the PA on 449,614 acres of rangeland in poor ecological condition, 25 percent on 828,980 acres in fair ecological condition and eliminated on 12,921 acres of riparian habitat in poor or fair ecological condition or watersheds in critical or severe erosion classes. Forage allocations under the worst case situation would be 155,319 AUMs for livestock. Initial allocations for big game would be 1,917 AUMs.

-In the long-term, 228,530 AUMs of forage would be available for livestock and 3,498 AUMs for big game.

-Chemical vegetation treatments would be implemented as described under the PA.

-Rangeland developments would be constructed as under the PA with the addition of 7.75 miles of fence to protect riparian habitat and watersheds in critical or severe erosion condition classes.

Elimination of Livestock Grazing (ELG) Alternative

The ELG Alternative includes the following major components.

-Livestock grazing would be eliminated on 1,624,090 acres of public land and 264,244 AUMs of grazing preference would be cancelled.

-No new grazing systems would be implemented and existing AMPs would be cancelled.

-No rangeland developments and vegetation treatments would be implemented or maintained unless needed for other BLM activities, such as wildlife and watershed. Rangeland developments that serve no useful purpose would be removed from public land.

ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

Energy Minerals

Proposed Action (PA)

The following impacts would occur under the PA.

-In the short- and long-term, impacts to vegetation, livestock grazing, the existing ACEC, wilderness, and other land uses would be minimal or nonexistent.

-Soils would be disturbed on an estimated 32,480 acres in the long-term as a result of seismic lines.

-In the short- and long-term, some wildlife habitat destruction would occur. The most significant impacts would occur in the grass flat, grass rolling upland, and pseudoriparian Standard Habitat Sites (SHS's), some of which are important habitats for threatened or endangered wildlife species.

-Human disturbance of big game and some threatened or endangered wildlife species would occur.

-Increased poaching of big game would be possible.

-There would be an irretrievable loss of oil and gas and geothermal resources as a result of production.

-Site-specific increases in sediment yield would occur and would involve stockponds and reservoirs in ephemeral drainages directly downstream from the area disturbed. The greatest impact would be from established production fields.

-Air quality would be affected on a broad scale by oil and gas and geothermal industries during periods of exploration. Pollution would become much more concentrated during development stages.

-Air quality could be affected if accidents occur during the development and production phases.

-In the short-term, 3,033 cultural sites could be located and in the long-term, 6,766 cultural sites as a result of new seismograph lines.

-An estimated 20,984 cultural sites would be protected from potential surface disturbance as a result of special stipulations protecting other values.

-Short-term visual contrasts in the landscape would be caused by surface disturbance and facilities associated with energy minerals activities.

-Four areas of special interest to recreationists would be protected by special stipulations: Kilbourne Hole National Natural Landmark (NNL), Franklin Mountains (South), Gila River Lower Box Riparian ACEC (proposed), and the West Potrillos Primitive Area.

-The dispersed recreation in the Franklin Mountains (North) could be impacted from drilling exploration activities.

-Material well-being would increase for those individuals who have the chance of employment.

-Occupational roles and identity associated with oil field activities would be increased.

-In the short-term, an increase in total direct income of $9.4 million (3 percent of total direct income) and an increase of approximately 790 jobs (2.5 percent of total employment) in the Resource Area economy would occur.

-In the long-term, an increase in total direct income of approximately $41 million (13 percent of total direct income) would occur. Total employment would increase by approximately 3,390 jobs (10 percent of total employment).

No Action (NA) Alternative

The following impacts would occur under the NA Alternative.

-Impacts to vegetation, geology and mineral resources, livestock grazing, water resources, the existing ACEC, wilderness, and other land uses would be minimal or nonexistent. Impacts to soils, air quality, cultural resources, visual resources, and social conditions are the same as those discussed under the PA.

-Continued energy minerals activities could cause raptor nest failure in the Florida Mountains and Hadley Draw.

-Two areas of special interest to recreationists, the Gila River Valley and the West Potrillos Primitive Area, would be protected from the impacts of exploration drilling activities.

-No special protection would be provided for special recreation values in the Kilbourne Hole NNL, Franklin Mountains (South) and Franklin Mountains (North).

-Annual rental fees of $108,460 would be lost from areas designated as NOL. Operational costs in areas with special stipulations would increase.

-Annual rental fees of $564,677 would be generated from areas leased with stipulations.

Maximization (MAX) of Energy Minerals Leasing Alternative

The following impacts would occur under the MAX Alternative.

-Impacts to vegetation, livestock grazing, the existing ACEC, and wilderness would be minimal to nonexistent. Impacts to soils, air quality, and visual resources are the same as those discussed under the PA.

-Areas which have important wildlife values would be disturbed. These areas include the Aden Lava Flow, the New Mexico Department of Game and Fish (NMDGF) Redrock Game Farm, and several mountain ranges which have nesting raptors, bighorn sheep, and other big game species.

-Additional geologic information on areas outside of high potential sites would be gained.

-Sediment yields would increase slightly and there would be a risk of spills and contamination of perennial waters in areas without special stipulations such as the Gila River Valley and several wetland/riparian areas.

-Physical and visual impacts near the nationally significant Fort Cummings could occur as a result of seismic prospecting.

-Improved access could cause increased vandalism on Fort Cummings, Oldtown, the Massacre Peak Petroglyph Site, and segments of the Butterfield Trail.

-Exploration and drilling activities could cause irreversible degradation of the natural values and aesthetics of the Kilbourne Hole NNL, Franklin Mountains (North) and (South), Gila Lower Box, and the West Potrillos Primitive Area.

-Opening 3,597 acres in the Organ Mountains to mineral entry would also open the Baylor Recreation Area and the Organ Mountains Recreation Area to locatable mineral entry; increased hardrock mining impacts could result.

-Irretrievable losses in association with ecological plots; major short-term disruption of existing uses in association with recreational areas and airports; and minor short-term disruption in association with public purposes such as sanitary landfills would occur as a result of energy minerals activities.

-Negative public attitudes would result from the lifting of special stipulations on Wilderness Study Areas, ecological plots, and some special designation areas, recreation and public purpose areas, and other areas.

-An annual rental fee of $3,817,761 would be generated from leasing all available acreage in the Resource Area.

Enhancement of Other Resource Values (EORV) Alternative

The following impacts would occur under the EORV Alternative.

-Impacts to vegetation, geology and mineral resources, livestock grazing, the existing ACEC, and wilderness would be minimal or nonexistent. Impacts to soils, air quality, and visual resources would be the same as those described under the PA.

-The significant wildlife values in the Cooke's Range, Cowboy Spring, Florida Mountains, Gila River riparian areas, and the NMDGF Redrock Game Farm would be protected by special stipulations.

-Special stipulations along the Gila River and on riparian/wetland areas would serve to maintain the hydrologic functions of riparian areas and limit the risk of surface water contamination.

-Fort Cummings, the Massacre Peak Petroglyph Site, Oldtown, and portions of the Butterfield Trail would be protected by special stipulations.

-A number of other areas totaling 683,635 acres that could contain cultural resources have either a NOL designation or no surface occupancy stipulation. These areas have a potential cultural site density of 21,364.

-Five areas of special interest to recreationists would be protected from the impacts of exploration drilling activities by the use of special stipulations. These areas include Kilbourne Hole NNL, Franklin Mountains (South) and (North), Gila River Lower Box Riparian ACEC (proposed), and the West Potrillo Primitive Area.

-Applying special stipulations to protect environmental values would provide positive public attitudes.

-Approximately $16,690 would be lost in annual rental fees as a result of areas designated NOL.

Rangeland Management

Proposed Action (PA)

The following impacts would occur under the PA.

-Impacts to geology and mineral resources, air quality, the existing ACEC, visual resources, wilderness, other land uses, and social conditions would be minimal or nonexistent.

-Vegetation would be disturbed or destroyed on 344 acres in the short-term and 71 acres in the long-term from construction of rangeland developments.

-Acreage in excellent, good, and fair ecological condition and good and fair forage value classes would increase in the long-term. Acreage in poor ecological condition and poor forage value class would decrease in the long-term. Acreage changes would be a result of proposed vegetation treatments, grazing management treatments and rangeland developments.

-Desirable and intermediate forage species production would increase 3 to 4 times on chemically treated areas.

-Vegetative ground cover would increase in the long-term.

-Soils would be disturbed on 344 acres in the short-term from construction of rangeland developments. In the long-term, 71 acres of soils would be removed from production of vegetation.

-Wind erosion on sprayed areas would decrease as much as 15 times as on unsprayed areas in the long-term.

-Bird and reptile diversities would increase, but rodent diversities and biomass would decrease.

-Game birds would have a better food source.

-The riparian SHS would improve. More forage and better quality habitat would be available for most big game, except javelina. Threatened or endangered wildlife species would benefit from improvement of the riparian SHS.

-Allotments in Category I cover 69 percent of the 3-County Area. Under the worst case analysis, these allotments would be reduced 22 percent below preference in the short-term. These AUMs would be held in suspended preference.

-There would be an increase of 4,447 AUMs on eight allotments, as a result of proposed vegetation treatments on 51,888 acres of public land.

-In the long-term, there would be an increase in AUMs of 2.5 percent above preference on Category I allotments as a result of proposed vegetation treatments, grazing management treatments, and rangeland developments.

-Allotments in Category M cover 27 percent of the public land in the 3-County Area and Category C allotments cover 4 percent. The allotments would maintain their present 5-year average licensed use of 75,871 AUMs in the short- and long-term. These allotments could be grazed to their preference of 87,132 AUMs.

-Livestock AUM reductions for allotments in all categories would be 19 percent below preference in the short-term and 2.6 percent below preference in the long-term.

-Surface runoff would decrease 0 to 18 percent depending on soil and vegetation types, ground cover, slope, and intensity of storms within the watershed.

-Water consumption by livestock and big game would increase by 12 percent in the long-term.

-Trampling damage to of cultural resources by livestock would decrease slightly in the short- and long-term due to reduction of livestock from the current preference.

-In the short-term, new data could be added on 120 cultural sites as a result of Class III inventories on 3,780 acres disturbed by construction of rangeland developments.

-Trampling damage to cultural resources by livestock would decrease slightly in fenced riparian areas.

-Conflicts between recreationists and livestock would be reduced in the Guadalupe Canyon Outstanding Natural Area (ONA) as a result of management through activity plans.

-Deer hunting visitor hours would increase by approximately 58,005 in the long-term.

-Total receipts for all ranch operations would be reduced as a result of the 9 percent decrease in AUMs from the 5-year average.

-In the short-term, direct income would be reduced less than 1 percent in the Resource Area economy. The range livestock industry would experience an 11 percent decrease in employment and direct income.

-Total receipts would increase by $505,000 in the long-term for all operations.

-Direct income and employment would increase in the long-term for the Resource Area economy by less than 1 percent. The range livestock industry would experience a 13.5 percent increase in employment opportunities and a 13.7 percent increase in direct income.

No Action (NA) Alternative

The following impacts would occur under the NA Alternative.

-Impacts to soils, geology and mineral resources, water resources, air quality, the existing ACEC, cultural resources, visual resources, recreation, wilderness, other land uses, and social and economic conditions would be minimal or nonexistent.

-Acreage in poor ecological condition and poor forage value class would increase in the long-term. Acreage in good and fair ecological condition and good and fair forage value classes would decrease in the long-term. There are no acres in excellent ecological condition. Acreage changes would be a result of the lack of vegetation treatments, grazing management treatments, and rangeland developments.

-Vegetative ground cover would increase in the long-term because of the increased number of annual species replacing perennial species.

-The riparian SHS would continue to deteriorate as a result of the decline in ecological condition.

-Forage for optimum big game numbers would not be available. Habitat for most endangered wildlife species would decline.

-Livestock grazing use would decrease in the long-term due to increased deterioration of rangeland condition, trend, and perennial forage production. Deterioration would be gradual; however, impacts from reduced livestock numbers could eventually become significant.

-Vegetation patterns would continue to change to brush dominated areas without some vegetation treatment. Desirable perennial forage would have a small chance for recovery.

Maximization (MAX) of Livestock Forage Production Alternative

The following impacts would occur under the MAX Alternative.

-Impacts to geology and mineral resources, air quality, visual resources, the existing ACEC, wilderness, and other land uses would be minimal or nonexistent.

-Vegetation would be disturbed or destroyed on 868 acres in the short-term and 172 acres in the long-term as a result of construction of rangeland developments.

-Acreage in excellent and good ecological condition and good forage value class would increase in the long-term. Acreage in fair and poor ecological condition and fair and poor forage value classes would decrease in the long-term. Acreage changes would be a result of proposed vegetation treatments, rangeland developments, and grazing management treatments.

-Desirable and intermediate forage species would increase 3 to 4 times on chemically treated areas and at least 4 times on mechanically treated and reseeded areas.

-Vegetative ground cover would increase in the long-term.

-Soil loss would increase in the short-term on areas treated for creosote.

-Wind erosion susceptibility would increase in the short-term as a result of chemical treatment of mesquite. Soil movement would decrease in the long-term due to the increased ground cover on the areas treated.

-In the short-term, soil erosion by wind and water would increase on mechanically treated areas due to the removal of protective vegetative cover. After vegetation becomes re-established following reseeding, soil erosion by wind and water would decrease.

-Habitat for pronghorn and mule deer would be enhanced by vegetation treatments. Preferred javelina forage would decrease after treatments. Treatments would be beneficial for endangered animal species associated with grasslands.

-Water for all wildlife would be increased by construction of proposed drinking troughs and dirt tanks. These are especially important for deer.

-An increase of 100,945 AUMs would occur on 116 allotments as a result of vegetation treatments on 880,997 acres in the long-term.

-Under the worst case situation, livestock grazing would be reduced to the same level as the PA in the short-term.

-In the long-term, there would be an increase in AUMs of 13 percent above preference.

-Runoff volume would increase an average of 9 percent on chemically treated areas for 2 to 3 years following vegetation treatment.

-In the long-term, runoff volume would decrease an average of 18 percent on chemically treated areas and 13 percent on mechanically treated areas.

-On-site utilization of water would be improved in the long-term.

-Water consumption by livestock and big game would increase 24 percent in the long-term.

-In the long-term, 496 cultural sites could be located as a result of rangeland developments and mechanical vegetation treatments. New data also would be added through Class III inventories for construction of rangeland developments.

-In the short-term, off-road vehicle (ORV) use would be restricted on 32 percent of the public land in Dona Ana County where chemical vegetation treatment is proposed.

-Deer hunting visitor hours would increase by approximately 58,005 in the long-term.

-The social well-being of ranchers and ranch hands would be enhanced in the long-term.

-Total receipts for all ranch operations would be reduced by $410,000. The Resource Area economy would experience a reduction of less than 1 percent in direct income and employment opportunities. The range livestock industry would experience an 11 percent decrease in employment and direct income.

-Total receipts for all operations would increase by approximately $1.5 million in the long-term. The Resource Area economy would experience an increase in direct income and employment of less than 1 percent. The range livestock industry would experience a 40 percent increase in employment opportunities and a 41 percent increase in direct income.

Enhancement of Other Resource Values (EORV) Alternative

The following impacts would occur under the EORV Alternative.

-Impacts to geology and mineral resources, air quality, visual resources, the existing ACEC, and other land uses would be minimal or nonexistent.

-Under the worst case situation, short-term consumption of forage would be reduced approximately 30 percent from the PA.

-Vegetation would improve on areas eliminated from livestock grazing for watersheds in critical or severe erosion condition classes or riparian habitat. Ground cover would increase in the long-term.

-Vegetation would be disturbed or destroyed on 352 acres in the short-term and 72 acres in the long-term by construction of rangeland developments.

-Acreage in excellent, good, and fair ecological condition and good forage value class would increase in the long-term. Acreage in poor ecological condition and fair and poor forage value classes would decrease in the long-term. Acreage changes would be a result of proposed vegetation treatments, grazing management treatments, and rangeland developments.

-Vegetative ground cover would increase in the long-term.

-Sediment yields would decrease on 12,501 acres where livestock grazing is eliminated on the breaks of the Gila River.

-Plant vigor, stand structure, and ground cover would improve because of improvement in the riparian SHS. More forage would be available for wildlife and improved stand structure would provide habitat for more species. Fisheries habitat would improve due to less sediment runoff and stream temperatures moderated by overhanging vegetation.

-Sufficient forage would be available for big game populations to reach optimum populations.

-Under the worst case situation, livestock grazing use would be reduced 41 percent below preference in the short-term. In the long-term, there would be a 13.5 percent decrease in AUMs below preference.

-There would be a loss of some grazing privileges on public land in all or parts of nine grazing allotments.

-Surface runoff volume would decrease by 8 percent in the long-term on a variety of range sites where vegetative cover increases a minimum of 5 percent.

-On-site utilization of water would improve in the long-term.

-Hydrologic functions of wetland areas would improve as a result of elimination of livestock grazing on riparian habitat.

-There would be a slight decrease in runoff and improved infiltration rates in the long-term as a result of elimination of livestock grazing on watersheds in critical or severe erosion classes. As a result of reduced runoff, there would be a decrease in the amount of sediment and dissolved solids transported to the Gila River. Water consumption by livestock and big game would increase by 1 percent in the long-term.

-The fencing of riparian areas and watersheds in severe or critical erosion classes would protect 404 cultural sites from trampling damage by livestock.

-Deer hunting visitor hours would increase by 58,005 in the long-term.

-The quality of water based recreation opportunities along the Gila River would be enhanced as a result of improvements in both riparian vegetation and watershed.

-Wilderness values would be enhanced in the Gila Lower Box Wilderness Study Area (WSA) as a result of improved recreation opportunities.

-In the long-term, the social status of the ranchers would be enhanced by increased opportunities for goods, services, and amenities. Ranching as a lifestyle would undergo major changes in the short-term but would be enhanced in the long-term.

-Total direct income would decrease by approximately $737,000 in the short-term and $19,484 in the long-term for the Resource Area economy.

-Total employment would decrease by 119 jobs in the short-term and 4 jobs in the long-term.

-Total receipts for all operations would decrease by $1.5 million in the short-term and by $37,000 in the long-term.

Elimination of Livestock Grazing (ELG) Alternative

The following impacts would occur under the ELG Alternative.

-Impacts to geology and mineral resources, air quality, visual resources, the existing ACEC, and other land uses would be minimal or nonexistent.

-Acreage in excellent and good ecological condition and good forage value class would increase in the long-term. Acreage in fair and poor ecological condition and fair and poor forage value classes would decrease in the long-term.

-Vegetative ground cover would increase in the long-term.

-Sediment yields would decrease where ground cover is improved.

-All forage would be available for wildlife, however, other factors might prevent big game from reaching optimum numbers.

-Habitat improvement would benefit threatened or endangered animal species.

-Many livestock operators would be forced to liquidate, disperse their livestock, or obtain other lands for grazing to remain in business.

-Surface runoff volume would decrease an average of 8 percent on range sites where vegetative cover increases a minimum of 5 percent.

-Dissolved solids and suspended sediments that would otherwise be transported by runoff water would decrease.

-Surface water quality would improve because of decreased stream bank erosion and reduced fecal coliform count.

-Overland flow velocities and quantities would be reduced and peak discharge would be lower. On-site utilization of water would increase through improvement of ungrazed areas and decreased runoff.

-Water consumption by livestock of 275 acre-feet per year would be eliminated. Wildlife would continue to consume 3 acre-feet per year.

-The churning of cultural sites and breakage of artifacts caused by livestock trampling would be eliminated on public land.

-Deer hunting opportunities would increase by 73,750 visitor hours.

-In the long-term, the natural and scenic qualities of WSAs would be enhanced through improved vigor of plant communities and removal of rangeland developments.

-Vehicle use would be reduced on existing access routes which would enhance opportunities for solitude and primitive recreation.

-There would be major changes in the size and distribution of the ranching population, however, there would be no major changes in the population of the Resource Area.

-The social well-being of livestock operators would be lowered and some would lose their role and identity as "rancher". Family stability would be disrupted, psychological well-being would be lowered, and the infrastructure would have increasing demands.

-There would be a serious disruption of the network of social relationships. The ranching lifestyle would be threatened. The psychological well-being would be diminished and, for many, a part of their heritage would be lost.

-Direct income and employment opportunities would decrease in the Resource Area economy by less than 1 percent.

-The range livestock industry would experience a decrease of 80 percent in direct income and employment opportunities. Total receipts for all operations would decrease by approximately $4.3 million.

Proposed Special Designation Areas

Proposed Action (PA)

Gila River Lower Box Riparian ACEC

The following impacts would occur under the PA.

-Impacts to soils, geology and mineral resources, air quality, the existing ACEC, other land uses, and social and economic conditions would be minimal or nonexistent.

-Bottomland species would re-establish themselves by restriction of livestock use, either by total exclusion on limited areas in the short-term (2-3 years) or exclusion where necessary during the growing season in the long-term.

-Ground cover would improve.

-Vegetation and water resources would have long-term protection and enhancement because of the restrictions on surface disturbing and mechanized activities.

-Substantial habitat improvement would occur for more than 300 terrestrial species and 12 fish species that can be found in the Gila River Lower Box. Seven of the terrestrial species and two of the fish species are on either the Federal or state endangered list.

-Raptors and all wildlife would be protected from disturbance.

-Poaching and accidental wildlife deaths would be minimized.

-There would be a loss of approximately 5 percent of the total AUMs for 7 months of each year on the Caprock allotment (1078).

-The Gila Lower Box stream channel would be stabilized thus reducing channel erosion and lowering sediment yield downstream.

-The hydrologic functions of surface water storage and groundwater recharge would be enhanced. Flood velocities would be reduced through improved riparian vegetation.

-The large Mogollon style petroglyph panels would be protected. The likelihood of vandalism to the petroglyph panels would be reduced.

-The natural and scenic values of the Gila Lower Box would be enhanced through redistribution of livestock and improved riparian vegetation.

-Visual resources would be protected from the short-term impacts of energy minerals activities.

-Bird watching opportunities would be improved and water based recreation opportunities would be enhanced.

-Interaction and conflicts between recreationists and livestock would decrease.

-Primitive recreation opportunities would be enhanced and protected.

-The wild character of the Gila Lower Box WSA would be retained as long as the area is administratively protected as an ACEC.

Gila River Middle Box Wildlife ACEC

The following impacts would occur under the PA.

-Impacts to vegetation, soils, geology and mineral resources, livestock grazing, air quality, cultural resources, visual resources, the existing ACEC, wilderness, other land uses, and social and economic conditions would be minimal or nonexistent.

-There would be a beneficial impact for the loach minnow and spikedace, both state endangered and Federal candidate species.

-Raptors and bats would be protected from harassment.

-Downstream riparian vegetation, including that of the Gila River Lower Box, would be sustained and the stream flow in the Gila Middle Box would be maintained.

-Water quality would be maintained and watershed conditions would improve in the long-term. This would indirectly help preserve the quality of water based recreation opportunities in the Middle Box.

Organ Mountains Scenic ACEC

The following impacts would occur under the PA.

-Impacts to soils, livestock grazing, water resources, air quality, cultural resources, the existing ACEC, other land uses, and social and economic conditions would be minimal or nonexistent.

-Existing water resources and vegetation would be protected and enhanced because of restrictions on surface disturbing and mechanized activities.

-Habitat for the resident mule deer herd and for all non-game species would be protected.

-Locatable and saleable minerals would be unavailable within the area withdrawn from mineral entry.

-Visual resources would be protected.

-Natural and scenic values would be protected.

-Dispersed recreation opportunities would be protected.

-Administrative protection would be provided for most of the Organ Mountains WSA. This portion of the ACEC would retain its wild character.

COMPARISON OF IMPACTS

The following table shows the comparison of the impacts of the Proposed Action and alternatives.

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

ENERGY MINERALS

Resource	Existing	Proposed Action		No Action Alternative		Maximization of Energy Minerals Leasing Alternative		Enhancement of Other Resource Values Alternative	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
PHYSICAL SETTING	stable	NS	NS	NS	NS	NS	NS	NS	NS
VEGETATION									
Ground Cover	NS	NS	NS	NS	NS	NS	NS	NS	NS
Threatened or Endangered (T/E) Plant Species	NS	NS	NS	NS	NS	NS	NS	NS	NS
SOILS									
Sediment Yield	NS	NS	NS	NS	NS	NS	NS	NS	NS
WILDLIFE									
Habitat	NC	NS	NS	NS	NS	SI	SI	SI	SI
Direct Disturbance/Animals	NC	SI	SI	SI	SI	SI	SI	SI	SI
GEOLOGY AND MINERAL RESOURCES	NC	NC	NC	NC	NC	NC	NC	NC	NC
LIVESTOCK GRAZING									
Grazing Use (AUMs)	NS	NS	NS	NS	NS	NS	NS	NS	NS
WATER RESOURCES									
Water Depletion (acre-feet)	6	45	120	45	120	45	120	45	120
Riparian/Floodplain Areas	stable	+	+	NC	NC	-	-	+	+
Water Quality	stable	+	+	NC	NC	-	-	+	+
AIR QUALITY	stable	local dust increase	NS	NC	NS	local dust increase	NS	NS	dust decrease
CULTURAL RESOURCES									
Sites Located (sites per 3 miles seismic line)	512	3,033	6,766	NC	NC	3,033	6,766	3,033	6,766
VISUAL RESOURCES	stable	NS-	NS-	NS-	NS-	NS-	NS-	NS-	NS-
RECREATION	stable	NS	NS	NS	NS	-	-	NS	NS
ACECs (naturalness)	NC	NC	NC	NS	NS	NS	NS	NC	NC
WILDERNESS	stable	NS-	NS-	NS-	NS-	NS-	NS-	NS-	NS-
OTHER LAND USES									
SOCIAL CONDITIONS									
Demography		slow growth rate	NC	NC	NC	NC	NC	NC	NC
Social Well Being		stable	NC	NC	NC	NC	NC	NC	NC
Lifestyles/Values		stable	NC	NC	NC	NC	NC	NC	NC
Attitudes, Concerns, Issues		mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed
ECONOMIC CONDITIONS (dollars)									
Annual Geophysical Exploration									
Regional Income	274,165,144	283,433,180	294,840,012	274,165,144	274,165,144	283,433,180	294,840,012	283,433,180	294,840,012
Change	0	9,268,036	20,674,868	0	0	9,268,036	20,674,868	9,268,036	20,674,868
Regional Employment	30,567	31,346	32,305	30,567	30,567	31,346	32,305	31,346	32,305
Change	0	779	1,738	0	0	779	1,738	779	1,738
Annual Geothermal Exploration									
Regional Income	274,165,144	274,337,584	276,333,812	274,165,144	274,165,144	274,337,584	276,333,812	274,337,584	276,333,812
Change	0	172,440	2,168,668	0	0	172,440	2,168,668	172,440	2,168,668
Regional Employment	30,567	30,578	30,720	30,567	30,567	30,578	30,720	30,578	30,720
Change	0	11	153	0	0	11	153	11	153

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

ENERGY MINERALS (continued)

Resource	Existing	Proposed Action		No Action Alternative		Maximization of Energy Minerals Leasing Alternative		Enhancement of Other Resource Values Alternative	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
ECONOMIC CONDITIONS (continued)									
One Producing Oil and Gas Well[h/]									
Regional Income	274,165,144	274,165,144	291,994,732	274,165,144	274,165,144	274,165,144	291,994,732	274,165,144	291,994,732
Change	0	0	17,829,588	0	0	0	17,829,588	0	17,829,588
Regional Employment	30,567	30,567	32,065	30,567	30,567	30,567	32,065	30,567	32,065
Change	0	0	1,498	0	0	0	1,498	0	1,498
Geophysical and Geothermal Exploration and One Producing Oil and Gas Well[h/]									
Regional Income	274,165,144	283,605,640	314,850,636	274,165,144	274,165,144	283,605,640	314,850,636	283,605,640	314,850,636
Change	0	9,440,496	40,685,492	0	0	9,440,496	40,685,492	9,440,496	40,685,492
Regional Employment	30,567	31,358	33,958	30,567	30,567	31,358	33,958	31,358	33,958
Change	0	791	3,391	0	0	791	3,391	791	3,391

RANGELAND MANAGEMENT

Resource	Existing	Proposed Action		No Action Alternative		Maximization of Livestock Forage Production Alternative		Enhancement of Other Resource Values Alternative		Elimination of Livestock Grazing Alternative	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
GRAZING USE (AUMs)	227,031[a/]	213,286[b/]	257,402	264,244[c/]	264,244[c/]	213,286[b/]	297,765	155,319[b/]	228,530	0	0
PHYSICAL SETTING	stable	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VEGETATION											
Ecological Condition (acres)											
Excellent	1,893	NS	18,822	NS	0	NS	18,822	NS	27,518	NS	36,213
Good	91,082	NS	197,712	NS	74,371	NS	350,939	NS	318,457	NS	439,201
Fair	825,651	NS	929,142	NS	672,212	NS	811,971	NS	867,112	NS	805,085
Poor	512,876	NS	285,824	NS	684,917	NS	249,768	NS	218,413	NS	151,001
Forage Value (acres)											
Good	223,460	NS	347,019	NS	214,186	NS	474,015	NS	474,433	NS	585,439
Fair	512,381	NS	581,155	NS	346,346	NS	490,215	NS	494,107	NS	415,749
Poor	695,661	NS	503,328	NS	870,970	NS	467,272	NS	462,962	NS	430,314
Ground Cover (percent)	14	NS	16	NS	15	NS	16	NS	17	NS	18
Threatened or Endangered (T/E) Plant Species	NC	NS	NS	NC	NC	- d/	- d/	+	+	+	+
SOILS											
Sediment Yield (acre ft/sq mi/yr)	NC	NC	NS	NC	NC	NS	NS	NS	NS	NS	NS
WILDLIFE											
AUMs Allocated[f/]	2,154	1,917	3,497	2,154	2,154	1,917	3,512	1,917	3,497	e/	e/
Deer Population	1,226	1,226	2,515	1,226	1,226	1,226	2,515	1,226	2,515		
Bighorn Sheep Population	55	55	471	55	471	55	471	55	471		
Pronghorn Population	10	10	30	10	10	10	42	10	30		
Javelina Population	g/	NC	NS	NC	I	D	D	NC	D	I	I
Estimated Overall Change in Standard Habitat Sites	NC	I	I	D	D	I	I	I	I	I	I
T/E Animal Species											
Riparian Associated	NC	+	+	-	-	+	+	+	+	+	+
GEOLOGY AND MINERAL RESOURCES	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
LIVESTOCK GRAZING											
Numbers of Operators	262	262	262	262	262	262	262	260	260	0	0

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

RANGELAND MANAGEMENT (continued)

Resource	Existing	Proposed Action		No Action Alternative		Maximization of Livestock Forage Production Alternative		Enhancement of Other Resource Values Alternative		Elimination of Livestock Grazing Alternative	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
WATER RESOURCES											
Water Depletion (acre-feet)											
Livestock and Wildlife	278	261	316	NC	NC	261	365	191	281	1	3
Stockpond Evaporation	825	825	894	NC	NC	825	960	825	894	NC	NC
Surface Runoff											
Acres Decrease 0-9%	NC	0	633,005	NC	NC	0	0	0	681,176	0	709,609
Acres Decrease 10-20%	NC	0	42,279	NC	NC	0	468,046	0	42,279	0	0
Acres Increase 0-9%	NC	42,279	0	NC	NC	462,816	0	42,279	0	0	0
Riparian/Floodplain Areas	stable	NC	NC	NC	NC	NC	NC	+	+	+	+
Water Quality	stable	+	+	NC	NC	-	-	+	+	+	+
AIR QUALITY	stable	local dust increase	NS	NS	NS	local dust increase	NS	NS	dust decrease	dust decrease	dust decrease
CULTURAL RESOURCES											
Sites Located Near Rangeland Developments	NC	120[1/]	0	NC	NC	496	0	121	0	0	0
VISUAL RESOURCES	stable	NS-	NS	NC	NC	NS-	NS-	NS-	NS	NS+	NS+
RECREATION	stable	NS	NS	NC	NC	-	NS-	NS	NS	NS	NS
Deer Hunting Visitor Hours	79,560	79,560	137,565	79,560	79,560	79,560	137,565	79,560	137,565	79,560	153,315
ACECs (naturalness)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
WILDERNESS	stable	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS+
OTHER LAND USES											
SOCIAL CONDITIONS											
Demography		slow growth rate	NC	NC	NC	NC	NC	NC	NC	NC	NC
Social Well Being		stable	NC	NC	NC	NC	NC	NC	NC	SI	SI
Lifestyles/Values		stable	NC	NC	NC	NC	NC	NC	NC	SI	SI
Attitudes, Concerns, Issues		mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed
ECONOMIC CONDITIONS (dollars)											
Total Receipts	7,813,071	7,402,371	8,318,530	7,813,071	7,813,071	7,402,371	9,320,464	6,264,020	7,775,458	3,454,055	3,454,055
Change	0	-410,700	505,459	0	0	-410,700	1,507,393	-1,549,051	37,613	-4,359,016	-4,359,016
Variable Costs	3,165,751	3,001,637	3,377,283	3,165,751	3,165,751	3,001,637	3,783,678	2,509,777	3,150,321	1,373,196	1,373,196
Change	0	-164,114	211,532	0	0	-164,114	617,927	-655,974	-15,430	-1,792,555	-1,792,555
Returns Above Variable Costs	4,647,320	4,400,734	4,941,247	4,647,320	4,647,320	4,400,734	5,536,786	3,754,243	4,625,137	2,080,859	2,080,859
Change	0	-246,586	293,927	0	0	-246,586	889,466	-893,077	-22,183	-2,566,461	-2,566,461
Fixed Costs[1/]	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918
Depreciation[1/]	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588
Returns to Operator, Labor, Management, Capital	2,958,814	2,712,228	3,252,741	2,958,814	2,958,814	2,712,228	3,848,280	2,065,737	2,936,631	392,353	392,353
Change	0	-246,586	293,927	0	0	-246,586	889,466	-893,077	-22,183	-2,566,461	-2,566,461
Regional Income	274,165,144	273,968,356	274,403,712	274,165,144	274,165,144	273,968,356	274,879,824	273,427,420	274,145,660	272,092,152	272,092,152
Change	0	-196,788	238,568	0	0	-196,788	714,680	-737,724	-19,484	-2,072,992	-2,072,992
Regional Employment	30,567	30,535	30,605	30,567	30,567	30,535	30,682	30,448	30,563	30,233	30,233
Change	0	-32	38	0	0	-32	115	-119	-4	-334	-334

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

PROPOSED SPECIAL DESIGNATION AREAS

Resource	Existing (No Designation)	Proposed Action (Designate ACEC)
Gila Lower Box Riparian		
VEGTATION		
Ecological Condition (acres)	NC	+
Forage Value (acres)	NC	+
Ground Cover	NC	+
Threatened or Endangered (T/E) Plant Species	NC	+
WILDLIFE		
Riparian Standard Habitat Site	D	I
Fisheries Habitat	D	I
T/E Species	-	+
GEOLOGY AND MINERAL RESOURCES	NC	NC
LIVESTOCK GRAZING	NC	-
WATER RESOURCES		
Riparian/Floodplain Areas	-	+
Water Quality	-	+
CULTURAL RESOURCES	NC	+
VISUAL RESOURCES	stable	+NC
RECREATION	stable	+
WILDERNESS	stable	+
Gila Middle Box Wildlife		
VEGTATION		
Ecological Condition (acres)	NC	NC
Forage Value (acres)	NC	NC
Ground Cover	NC	NC
Threatened or Endangered (T/E) Plant Species	NC	NC
WILDLIFE		
Riparian Standard Habitat Site	D	I
Fisheries Habitat	D	I
T/E Species	-	+
GEOLOGY AND MINERAL RESOURCES	NC	NC
LIVESTOCK GRAZING	NC	NC
WATER RESOURCES		
Water Quality	NC	+
CULTURAL RESOURCES	NC	NC
VISUAL RESOURCES	stable	NC
RECREATION	stable	+
Organ Mountains Scenic		
VEGTATION		
Ecological Condition (acres)	NC	+
Forage Value (acres)	NC	+
Ground Cover	NC	+
Threatened or Endangered (T/E) Plant Species	NC	+

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

PROPOSED SPECIAL DESIGNATION AREAS (continued)

Resource	Existing (No Designation)	Proposed Action (Designate ACEC)
Organ Mountains Scenic (continued)		
WILDLIFE		
Big Game Habitat	NC	+
GEOLOGY AND MINERAL RESOURCES		
Locatable	NC	-
Leasable	NC	NS
Saleable	NC	NS
LIVESTOCK GRAZING	NC	NC
VISUAL RESOURCES	stable	+
RECREATION	stable	+
WILDERNESS	stable	+

Source: BLM Las Cruces District Las Cruces District Office Files, 1980.

Notes:
a/Preference is 264,244 AUMs but 5-year average licensed use is 227,031.
b/Worst case basis.
c/Shows present preference, but actual use would probably average the same as the 5-year average of 227,031.
d/Mechanical treatment, seedling, and chemical treatment only; other values same as PA.
e/All AUMs available to wildlife.
f/Populations for areas with more than .5 animals per section (Map 2-2).
g/No numbers calculated; population trend given.
h/The producing oil well is assumed to occur in the long-term for each alternative.
i/Cultural resource numbers refer to number of sites; to get acres, multiply by 32.
j/Fixed costs and depreciation are assumed to remain constant.
NC: No change from existing (changes not quantifiable).
NS: Not significant.
SI: Significant impact.
+ : Beneficial.
- : Adverse.
I : Increased value.
D : Decreased value.
0 : Zero.

CHAPTER 1

PROPOSED ACTION AND ALTERNATIVES

CHAPTER 1

PROPOSED ACTION AND ALTERNATIVES

INTRODUCTION

Location

The Las Cruces/Lordsburg Resource Area (LCLRA) is located in southwestern New Mexico and includes Dona Ana, Luna, Hidalgo, and Grant Counties. (See Map 1-1 for general location.) The Resource Area contains approximately 9 million acres of which 32 percent or 2.9 million acres is public land, 17 percent (1.5 million acres) is state land, 30 percent (2.7 million acres) is privately owned, 7 percent (.6 million acres) is withdrawn land, and 14 percent (1.3 million acres) is other Federal land. (See Visual A in map pocket for land status.) The Bureau of Land Management (BLM) administers the resources on a total of 3.8 million acres within the Resource Area; of these, 2.9 million acres are surface and subsurface (minerals) and .9 million acres are subsurface only. Table 1-1 shows the mineral ownership in the LCLRA.

TABLE 1-1

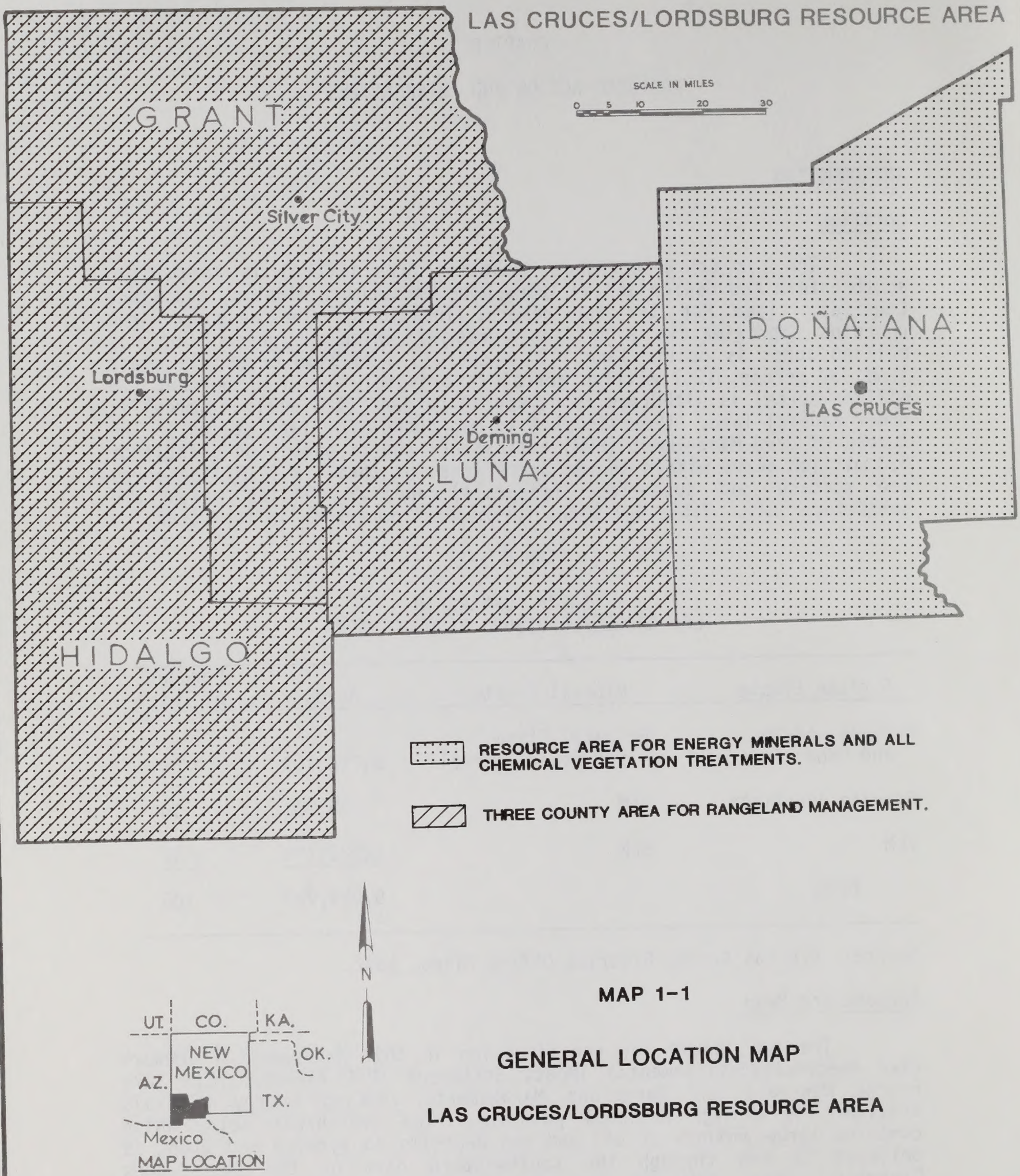
MINERAL OWNERSHIP
LAS CRUCES/LORDSBURG RESOURCE AREA

Surface Estate	Mineral Estate	Acres	Percent of Total
Private, State, and Other Federal	Private, State, and Other Federal	5,256,159	58
Private and State	BLM	893,972	10
BLM	BLM	2,923,789	32
TOTAL		9,073,920	100

Source: BLM Las Cruces District Office Files, 1982.

Purpose and Need

The two issues for consideration in this Management Framework Plan Amendment/Environmental Impact Statement (MFP Amendment/EIS) are Energy Minerals and Rangeland Management. Making energy minerals available is a high national priority. The Overthrust Belt, which contains large amounts of oil and gas deposits in Wyoming and Utah, is believed to run through the southwestern part of the Las Cruces District. New interest in the Overthrust Belt has prompted reconsideration of constraints imposed by existing MFPs in the LCLRA. Existing rangeland condition in the Resource Area indicates a need to


LAS CRUCES/LORDSBURG RESOURCE AREA
SCALE IN MILES
0
5
10
20
30
GRANT
Silver City
Lordsburg
Deming
LUNA
DOÑA ANA
LAS CRUCES
HIDALGO
RESOURCE AREA FOR ENERGY MINERALS AND ALL CHEMICAL VEGETATION TREATMENTS.
THREE COUNTY AREA FOR RANGELAND MANAGEMENT.
N
UT.
CO.
KA.
OK.
NEW MEXICO
AZ.
TX.
Mexico
MAP LOCATION

MAP 1-1

GENERAL LOCATION MAP

LAS CRUCES/LORDSBURG RESOURCE AREA

SOURCE: BLM Las Cruces District Files 1982

concentrate management, rangeland developments, and vegetation treatments on those allotments that have a good potential for improvement and resolution of conflicts.

With regard to the issues of Energy Minerals and Rangeland Management, a Proposed Action (PA) and four alternatives to amend the plans have been developed. It has been determined that the impacts of implementation would be a major Federal action requiring an EIS. This document, a MFP Amendment/EIS, will provide analysis of alternatives so a decision can be made to amend existing plans. Issues not affected by this Amendment will remain valid (see page 1-5 on conformance).

MANAGEMENT FRAMEWORK PLAN (MFP) AMENDMENT PROCESS

The planning process described in BLM planning regulations (43 Code of Federal Regulations [CFR] Part 1600) consists of nine action steps and are summarized below: (1) Identification of Issues, (2) Development of Planning Criteria, (3) Inventory Data and Information Collection, (4) Analysis of Management Situation, (5) Formulation of Alternatives, (6) Estimation of Effects of Alternatives, (7) Selection of Preferred Alternative, (8) Selection of Resource Management Plan, and (9) Monitoring and Evaluation. The first seven action steps have been completed.

Identification of Issues

BLM specialists and managers together with the public, other Federal agencies, state and local governments, and Indian tribes developed the issues for the planning effort. While numerous issues were developed for consideration, budget and time constraints precluded some issues from being analyzed in this MFP Amendment/EIS. The two issues that will be considered are: Energy Minerals and Rangeland Management.

For the Energy Minerals issue, the entire LCLRA will be under consideration. The Energy Minerals issue includes oil and gas and geothermal energy operations. This issue will involve the identification and analysis of areas where present knowledge indicates that potential resource conflicts would be significant enough to either preclude or restrict energy minerals leasing and associated exploration, development, production, and abandonment operations. Maximum exploration opportunities would be permitted in the least restrictive manner possible. The most significant conflicts appear to be located in Hidalgo and Dona Ana Counties.

For the Rangeland Management issue, the area for consideration will be Hidalgo, Grant, a large portion of Luna County in New Mexico and a small portion of Cochise County in Arizona (approximately 12,611 acres). (Dona Ana and a small portion of Luna County were covered in the Southern Rio Grande Grazing EIS [1981].) Overlay 1 shows the allotments to be considered in this analysis. This issue will involve analysis and decision on allocation of vegetation to livestock, big game, and watershed, determination of levels of livestock grazing management, and identification of needed support facilities. Chemical vegetation treatments will be analyzed for the entire LCLRA.

Development of Planning Criteria

After the issues had been identified, planning criteria were developed and used to guide the plan. Criteria set the standards for data collection, establishing alternatives to be examined, and selecting the preferred alternative and final plan. The basis for developing criteria were laws, executive orders, regulations, planning principles, national and state BLM guidance, public involvement, and available resource information. Planning criteria ensure that the plan is tailored to the issues and that unnecessary collection and analysis of data are avoided. Criteria used in the development of this plan are contained in Technical Report I, which is available for review at the Las Cruces District Office. (Technical Reports contain background information or supporting data for the MFP Amendment/EIS.)

Inventory Data and Information Collection

Las Cruces District specialists gathered information between 1980 and 1982 on eight basic resources: minerals, vegetation, watershed, wildlife habitat, visual resources, wilderness, cultural resources, and threatened or endangered species. The inventories involved some field studies, literature searches, and consultation with agencies, organizations, and individuals. This information provided the data base for developing this MFP Amendment/EIS.

Analysis of Management Situation

The analysis of the management situation was used to determine the capability of the public land resources for responding to the needs and issues identified through public participation and coordination efforts and to National and State Director guidance. In addition, inventory data was analyzed to determine whether there were areas eligible for further consideration as Areas of Critical Environmental Concern (ACECs). The affected environment of the Resource Area is documented in Chapter 2. The opportunities identified to address the planning issues provided the basis for alternative formulation.

Formulation of Alternatives

The MFP Amendment/EIS analyzes impacts of the Proposed Action (PA) and four possible alternatives identified by BLM. The alternatives to be considered, in addition to the PA are: No Action (NA), Maximization (MAX) of Energy Minerals Leasing and Livestock Forage Production, Enhancement of Other Resource Values (EORV), and Elimination of Livestock Grazing (ELG). For alternatives considered but not analyzed, see Chapter 4, page 4-10.

Estimation of Effects of Alternatives

An assessment of the physical, biological, economic, and social effects of implementing each alternative is presented in Chapter 3.

This step is the environmental analysis required by the National Environmental Policy Act.

Selection of Preferred Alternative

The Proposed Action presented in Chapter 1 was formulated based on (1) issues identified through the planning process, (2) information received at public meetings, workshops, and letters, (3) formal coordination and consultation with other agencies, (4) decision criteria developed and considered by management, and (5) evaluation of the impacts associated with each alternative. The Proposed Action is the preferred alternative.

Selection of Resource Management Plan

This step is the amendment selection approval process and will determine the management direction for the Resource Area using the analysis of the two issues in this plan (Energy Minerals and Rangeland Management).

The management direction will be made after (1) evaluation of comments received on the Draft MFP Amendment/EIS, (2) preparation of the Final MFP Amendment/EIS, (3) evaluation of comments on the final which leads to, (4) the published record of decision (ROD) which contains the resource management plan for the issues analyzed.

Monitoring and Evaluation

Following the publication of the ROD, intervals and standards for monitoring and evaluating the resource management plan will be established. The intervals will not be more than 5 years. Standards will be developed to determine whether mitigating measures are satisfactory, whether assumptions used in the assessment of impacts are correct, or whether there has been significant change in the related plans of other Federal agencies, state or local governments, or Indian tribes. The information gained will be incorporated into any future planning.

CONFORMANCE

In accordance with the Planning Regulations [43 CFR Subpart 1601.8(b)(3)], the Proposed Action and alternatives (with the exception of the No Action Alternative) as discussed in this document propose changes in existing MFPs and will require a MFP Amendment/EIS. Plans in existence covering the LCLRA are the Gila MFP (1978), Hermanas MFP (1969; revised 1971), and Southern Rio Grande MFP (1982). The analysis and decisions in the Southern Rio Grande EIS (1981) and MFP are in conformance with all activities except energy minerals leasing.

Consistency With Other Plans

At this time, there are no known inconsistencies between any of the alternatives and officially approved and adopted resource related policies and programs of other Federal agencies, state and local governments, and Indian tribes, except the Elimination of Livestock Grazing Alternative. Continuing coordination and consultation will take place during the public comment period on the Draft MFP Amendment/EIS, the Final MFP Amendment/EIS, and the Record of Decision. During this time, other inconsistencies may be identified.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action (PA)

Objectives

The objectives of the Proposed Action are: (1) to meet the demand for mineral exploration and development while minimizing the damage to other resources from these activities; (2) to provide forage for livestock while accommodating the needs of wildlife and watershed; and (3) to concentrate management on those allotments with the most potential for improvement and resolution of resource conflicts. In addition, priority has been given to the identification, proposed designation, protection, and special management proposals for ACECs.

Energy Minerals

Although BLM exerts influence over placement and rehabilitation of energy minerals operations, the discretionary action controlled solely by BLM is energy minerals leasing. Therefore, the alternatives available for analysis of the energy minerals activity are related to leasing.

Under the PA, 9,836 acres are not open to leasing (NOL). The PA would allow energy minerals leasing and associated exploration, development, production, and abandonment operations within the LCLRA, subject to special stipulations, on 675,894 acres. (See Overlays 2 and 3 in map pocket for areas with special stipulations.) The remainder of the Federal mineral estate in the Resource Area, 3,132,031 acres, is open to energy minerals leasing with no special restriction or stipulation required other than those required under the standard operating procedures

Under the PA, the following special stipulations would be used.

1. Protective Stipulation (PS). This would be used when there is a need to alert the lessee/operator to special values or uses within the leasehold. Unique operating procedures would be required, which may result in higher than normal operating costs or which may have stringent performance standards to protect or control adverse impacts. The stipulation also would require the reclamation of the disturbed lands. This special stipulation could allow surface use and occupancy if the operator can meet the restrictions or performance standards. (See Appendix E-1 for complete text of the Protective Stipulations.)

2. Wilderness Protection Stipulation (WPS). This would be used for lands under wilderness review. With this special stipulation, activities may be permitted under the lease so long as BLM determines

they will not impair wilderness suitability. (See Appendix E-1 for the complete text of the Wilderness Protection Stipulation.)

3. No Surface Occupancy (NSO) Stipulation. This stipulation would be used where surface disturbing activities associated with energy minerals are not compatible with other management objectives for a specific area. However, directional drilling from open adjacent land would be allowed. (See Appendix E-1 for the complete text of the NSO Stipulation.)

In each case where a special stipulation is proposed, the area would be specifically described and reasons for the restriction would be included. (Technical Report II contains the legal descriptions of areas proposed with special stipulations and Appendix E-1 contains the reasons for the restrictions.) Table 1-2 is a summary by alternative of the areas being considered for special stipulation and acres involved for each area. Overlays 2 and 3 show the general location for all areas being considered for special stipulation.

Energy Minerals Operations Under the Proposed Action

Following is a summary of various energy minerals (oil and gas and geothermal) operations which normally result in environmental impacts. The operations are divided into five phases: geophysical exploration, drilling exploration, development, production, and abandonment. Oil and gas and geothermal exploration and abandonment operations are very similar, so they will be discussed collectively. Development and production operations differ and will be discussed separately. Anticipated surface disturbing activities for the short- and long-term are shown in Tables 1-3 and 1-4, respectively.

Geophysical Exploration (Oil and Gas and Geothermal)

Seismic prospecting is a popular geophysical exploration method for oil and gas. Shock waves are generated in the crust of the earth using a vibrator at the surface or by using explosives. In the vibrator method, there are usually four large trucks traveling in line, each equipped with a vibrator pad. All four vibrators are dropped to the ground simultaneously to generate the shock waves. Detectors are placed in the ground to record these waves and the signals travel to a recording truck via cables. The trucks then move a short distance forward and repeat the process. In addition to the vibrator trucks and the recording truck, other equipment commonly includes one or two cable trucks and some support pickup trucks. Travel is usually along existing roads and trails, but off-road travel is often necessary.

TABLE 1-2

STATUS OF ENERGY MINERALS LEASING BY ALTERNATIVE

Key: NOL - Not Open to Leasing
Open - Open to leasing with no special stipulations attached
WPS - Open to lease with a Wilderness Protection Stipulation attached
NSO - Open to lease with a No Surface Occupancy Stipulation attached
PS - Open to lease with a Protective Stipulation attached (see Appendix E-1)

Name	Proposed Action	No Action	Maximization of Energy Minerals Leasing	Enhancement of Other Resource Values	Acres (Federal Mineral Estate)
Wilderness Study Areas (WSAs)[a/]					
Aden Lava Flow	WPS	WPS	Open	WPS	23,857
Alamo Hueco Mountains	WPS	WPS	Open	WPS	13,786
Big Hatchet Mountains	WPS	WPS	Open	WPS	60,019
Blue Creek	WPS	WPS	Open	WPS	14,096
Cedar Mountains	WPS	WPS	Open	WPS	14,911
Cooke's Range	WPS	WPS	Open	WPS	19,608
Cowboy Spring	WPS	WPS	Open	WPS	6,699
Gila Lower Box	WPS	WPS	Open	WPS	8,555
Las Uvas Mountains	WPS	WPS	Open	WPS	11,067
Organ Mountains	WPS	WPS	Open	WPS	7,144
Robledo Mountains	WPS	WPS	Open	WPS	12,811
West Potrillo Mountains and Mount Riley	WPS	WPS	Open	WPS	155,105
Guadalupe Canyon ISA[a/]	WPS	WPS	Open	WPS	3,692
Non-WSAs Under Appeal[a/]					
Redrock	WPS	WPS	Open	WPS	3,833
Florida Mountains	WPS	WPS	Open	WPS	37,944
Cooke's Range (2 pieces)	WPS	WPS	Open	WPS	6,215
Cedar Mountains (3 pieces)	WPS	WPS	Open	WPS	65,375
Arizona WSAs in the Resource Area[a/]					
Peloncillo Mountains (Doubtful Canyon)	WPS	WPS	Open	WPS	4,128
Apache Box	WPS	WPS	Open	WPS	937
Hoverrocker	WPS	WPS	Open	WPS	22
Ecological Plots					
Bertoglio/Merrill	PS	PS	Open	NSO	40
Culberson	PS	PS	Open	NSO	40
Diamond	PS	PS	Open	NSO	40
Rodrick	PS	PS	Open	NSO	40
Special Designation Areas					
Aden Lava Flow RNA	NSO	PS	Open	NOL	3,666
Baylor Recreation Area	NOL	NOL	Open	NOL	838
Central Peloncillo RNA/ACEC	NSO	PS	Open	NSO	2,644
Dona Ana Recreation Area	PS	NOL	Open	NOL	2,826
Gila River Lower Box Riparian ACEC (Proposed)	NSO	b/	Open	NSO	2,631
Gila River Middle Box Wildlife ACEC (Proposed)	NSO	b/	Open	NSO	720
Granite Gap Recreation Area	b/	NOL	Open	b/	960
Guadalupe Canyon ONA	NSO	NOL	Open	NSO	3,692
Kilbourne Hole NNL	NSO	Open	Open	NSO	4,720
Needles Eye Picnic Site	NSO	NOL	Open	NSO	960
Organ Mountains Scenic ACEC (Proposed)	NSO	b/	Open	NSO	6,017
C&MU lands within ACEC	NOL	b/	Open	NOL	2,930
Subsurface Only	NSO	Open	Open	NSO	2,753
Organ Mountains Recreation Area	NOL	NOL	Open	NOL	2,759
Organ Mountains Recreation Lands	PS	NOL	Open	NSO	27,193
West Potrillo Primitive Area	PS	NOL	Open	PS	67,373
Recreation and Public Purposes (R&PPs)					
Sanitary Landfills					
Anthony	PS	PS	Open	PS	10
Butterfield	PS	PS	Open	PS	30
Chaparral	PS	PS	Open	PS	10
Garfield	PS	PS	Open	PS	5
Hatch	PS	PS	Open	PS	10
Hill	PS	PS	Open	PS	10
La Mesa	PS	PS	Open	PS	40
La Union	PS	PS	Open	PS	11
Las Cruces (2)	PS	PS	Open	PS	80
Luna County	PS	PS	Open	PS	10
Mesilla Dam	PS	PS	Open	PS	40
Mesquite	PS	PS	Open	PS	20
Rincon	PS	PS	Open	PS	11
Salem	PS	PS	Open	PS	10
Silver City	PS	PS	Open	PS	40
Virden	PS	PS	Open	PS	20

TABLE 1-2 (concluded)

STATUS OF ENERGY MINERALS LEASING BY ALTERNATIVE

Name	Proposed Action	No Action	Maximization of Energy Minerals Leasing	Enhancement of Other Resource Values	Acres (Federal Mineral Estate)
R&PPs (continued)					
Cemetaries					
Dona Ana County Cemetary	PS	PS	Open	NSO	10
Shakespeare Cemetary (Hidalgo)	PS	PS	Open	NSO	20
Religious Sites					
Lords Ranch (Our Lady's Youth Center-Dona Ana)	PS	PS	Open	NSO	320
Tortugas Mountain (Dona Ana)	PS	Open	Open	NSO	1
Observatory Sites					
(NMSU) Astronomical Research (Dona Ana)	PS	PS	Open	NSO	640
(Northwestern University) Astronomical Research and Educational Purposes (Dona Ana)	PS	PS	Open	NSO	160
School Sites					
Gadsden Elementary	PS	Open	Open	NSO	30
Gadsden High School (Proposed)	PS	Open	Open	NSO	150
Recreational Use Areas					
Grant County--Scientific, Educational, and Recreational Use	PS	PS	Open	NSO	134
Hidalgo County--Recreational Use	PS	PS	Open	PS	20
Las Cruces Shooting Range	PS	PS	Open	PS	480
Luna County--Public Recreation Area	PS	PS	Open	PS	160
Spring Canyon (Luna)--Public Park and Recreation Area	PS	PS	Open	PS	560
Village of Central (Luna)--Municipal Park and Roadside Rest Area	PS	PS	Open	PS	160
(Proposed) West Mesa Park (Dona Ana)	PS	Open	Open	PS	1,920
Miscellaneous					
Educational Television Site (Dona Ana)	PS	PS	Open	NSO	20
Prison Site (Dona Ana)	NSO	PS	Open	NSO	262
Water Tanks--Silver City (Luna)	NSO	PS	Open	NSO	2
City Expansion (Las Cruces)	PS	PS	Open	PS	2,834
Airports					
Hatch	NSO	PS	Open	NSO	120
Las Cruces-Crawford	NSO	PS	Open	NSO	2,210
Southern Dona Ana Airport	NSO	PS	Open	NSO	1,712
Other Areas					
Alamo Hueco Mountains (Bighorn Habitat Area)	PS	PS	Open	PS	22,322
Big Hatchet Mountains (Bighorn habitat Area)	PS	PS	Open	PS	48,155
Butterfield Trail (well preserved ruts) (Proposed)	Open	Open	Open	PS	7,980
Cooke's Range (Wildlife) (Proposed)	PS	b/	Open	NSO	11,645
Cowboy Spring (Bighorn Reintroduction Area) (Proposed)	PS	b/	Open	NSO	6,699
Florida Mountains Raptor Nesting Area (Proposed)	PS	Open	Open	NSO	13,906
Fort Cummings	NOL	NOL	Open	NOL	5,999
Franklin Mountains (South) (Proposed)	PS	Open	Open	NSO	1,272
Franklin Mountains (North) (Proposed)	Open	Open	Open	PS	2,860
Gila River--					
Gila River Riparian Areas (Proposed)	PS	b/	Open	NSO	12,577
Gila River Valley	b/	PS	Open	b/	21,563
Soils Area (Proposed)	b/	b/	Open	NSO	13,404
Hadley Draw Riparian Area (Proposed)	PS	Open	Open	NSO	1,350
Massacre Peak (Petroglyph Area)	NOL	NOL	Open	NOL	240
NMSU College Ranch	PS	PS	Open	PS	60,860
Oldtown (Proposed)	PS	Open	Open	NSO	20
Organ Mountains (Wildlife) (Proposed)	PS	b/	Open	NSO	9,360
Peloncillo Mountains (Crucial Habitat Area)	b/	PS	Open	b/	80,470
Peloncillo Mountains (Wildlife Habitat Area) (Proposed)	PS	b/	Open	PS	82,196
Redrock Game Farm (Proposed)	PS	Open	Open	NOL	632
San Simon Cienega	PS	PS	Open	PS	4,200
San Simon Cienega Riparian Area (Proposed)	PS	b/	Open	NSO	828

Source: BLM Las Cruces District Office Files, 1982.

Note: a/The WSAs under the MAX Alternative would be open only if Congress drops the areas from wilderness designation. The Draft EA for WSAs is scheduled for release in 1983.

b/This area is covered in whole or in part within another area, with a stipulation to protect the same or similar values (see Overlays 2 and 3 in map pocket).

TABLE 1-3

SURFACE DISTURBANCE ON PUBLIC LAND BY ENERGY MINERALS ACTIVITIES
SHORT-TERM 1980 TO 1994

Activity	Standard Area of Disturbance	Quantity	Acres Disturbed
	Oil and Gas[a/]		
Geophysical Exploration 0 to 20% slopes	260 NOIs @ 35 mi/ea 1.6 acre/mile of disturbance	9,100 miles	14,560 acres
Exploration Drilling "Wildcat" 0 to 10% slopes	2.77 acres of disturbance	10 well pads	27.7 acres
Access Roads	16' width 50' ROW 10 roads 1.5 miles/road 2.88 acres/mile of disturbance	15 miles	43.2 acres
	Geothermal Energy[b/]		
Shallow Temperature Gradient Holes	.10 acre of disturbance per hole	5 holes/year 75 holes	7.5 acres

Sources: a/Acreage disturbance and access road sizes are taken from the Buffalo Resource Area Oil and Gas EA, Casper, Wyoming (1980) and the Oil and Gas Leasing in Kingman Bighorn Sheep Habitat EA (1982).

b/BLM Las Cruces District Files, 1982; USDI Geothermal Handbook, 1976.

One explosive method for oil and gas exploration, shot-holes, involves drilling holes about 6 inches in diameter from a depth of a few feet to 200 feet. The holes are loaded with explosives and the charges are then detonated. The vehicles used for a shot-hole drilling program include a truck-mounted drilling rig, water truck, recording truck, and several support pickup trucks. Existing roads and trails are used when possible, but off-road travel is sometimes necessary. Another explosive method, the prima cord, involves emplacing prima cord underground approximately 36 inches with a trencher instead of a truck-mounted drill rig. Other equipment would be basically the same. It is exploded underground for the energy source and rarely explodes above the surface.

TABLE 1-4

SURFACE DISTURBANCE ON PUBLIC LAND BY ENERGY MINERALS ACTIVITIES
LONG-TERM 1980 TO 2010

Activity	Standard Area of Disturbance	Quantity	Acres Disturbed
	Oil and Gas[a]		
Geophysical Exploration 0 to 20% slopes	580 NOIs @ 35 mi/ea 1.6 acre/mile of disturbance	20,300 miles	32,480 acres
Drilling Exploration and Production 0 to 10% slopes	2.77 acres of disturbance	20 well pads (1 producing)	55.4 acres
Access Roads	16' width 50' ROW 20 roads 1.5 mile/road 2.88 acres/mile	30 miles	86.4 acres
Powerlines (tied to existing facilities in Playas Valley)	5 miles 2.4 acres/mile of disturbance	5 miles	12 acres
Related Facilities Tank Batteries Separators	5 acres/site	1 site	5 acres
	Geothermal Energy[b]		
Shallow Temperature Gradient Holes	.10 acre of disturbance per site	5 holes/year 155 holes	15.5 acres
Drilling Exploration and/or Production Wells	5 acres of disturbance per site	3 wells	15 acres
Access Roads	16' width 50' ROW 3 roads 1.5 miles/road 2.88 acres/ disturbance	4.5 miles	12.96 acres
Greenhouse	20 acres of disturbance	1 site	20 acres

Sources: a/Acreage disturbance and access road sizes are taken from the Buffalo Resource Area Oil and Gas EA, Casper, Wyoming (1980) and the Oil and Gas Leasing in Kingman Bighorn Sheep Habitat EA (1982).

b/BLM Las Cruces District Files, 1982; USDI Geothermal Handbook, 1976.

The electrical resistivity survey is a commonly used method in geothermal exploration. This method involves burying metal plates or driving metal rods into the ground and transmitting an electrical current through these electrodes. Pickup trucks are used on existing roads and trails. Occasionally, off-road travel is necessary.

To provide a consistent basis for impact analysis, past exploration activity was analyzed and used to predict future levels of anticipated use. Analysis of the data indicates that geophysical exploration for oil and gas before 1978 was minimal (less than 5 Notices of Intent [NOIs] per year), from 1978 through 1981, a gradual increase occurred, and from 1981 to 1982, geophysical exploration increased rapidly. Exploration activity is anticipated only in areas having favorable oil and gas potential, as shown on Map 2-2.

Analysis of past exploration for geothermal energy shows that exploration activity was at its peak in the late 1970's and exploratory shallow temperature gradient holes are now on the decline, with exploration substantially complete (BLM Notice of Intent to Conduct Geothermal Resource Exploration Operations n.d.). Drilling of shallow temperature gradient holes is anticipated on the East Mesa in Dona Ana County and in areas of favorable geothermal potential, as shown on Map 2-2. This exploration is anticipated at the rate of five holes per year.

Drilling Exploration (Oil and Gas and Geothermal)

In geothermal exploration, Federal regulations provide for the drilling of shallow temperature gradient holes without the necessity of acquiring a geothermal lease. This is in contrast to oil and gas regulations where drilling is allowed only subsequent to the issuance of a lease.

Temperature gradient holes are generally less than 2,000 feet deep. They are drilled utilizing portable, truck-mounted drill rigs and usually require only a few days to complete. They are usually drilled next to existing roads and trails. Mud pits are commonly dug, but portable steel pits are also used.

Deep drilling operations for geothermal and for oil and gas are virtually the same. An access road (usually 16-20 feet wide) is constructed to accommodate a drill rig and support vehicles. Generally, the types of equipment used include track-mounted and rubber-tired dozers, scrapers, and motor graders. Existing roads and trails are improved in places and occasionally culverts and cattleguards are installed. During construction operations, brush is cleared, the area is graded, and the access road and drill site may be improved with a surface layer of caliche. Cut and fill construction may be required.

Drilling sites vary in size from about 100 feet square (about 0.2 acre) for shallow wells to about 300 by 350 feet (about 2.5 acres) for deeper wells. Equipment and structures on the drilling site include the drill rig, mud pumps, generators, mud tanks, drill pipe, storage sheds, fuel and water storage tanks, a mud logging trailer, and one or two trailers that house drilling personnel.

A reserve pit is also constructed for containing waste fluids and cuttings. It is lined with impermeable clay or plastic to prevent seepage. The pit is usually 8 to 12 feet deep and can cover as much as an acre.

Drilling operations are continuous. The duration of operations ranges from a week for a 2,000 foot well to several months for deep wells.

Drilling activity has steadily increased from 1920 to 1960. From 1960 through 1980, drilling activity has increased at a lesser rate. (See Appendix E-2 for methodology used in the analysis.)

Development and Production Operations

Oil and Gas

Surface disturbance at the development and production stages is extensive. Production can continue for 20 years or more. If a commercial oil and gas reservoir is discovered, additional wells are drilled and completed, and production equipment is installed. Additional roads and facility sites are built. Well spacing is approved by the Minerals Management Service (MMS) and the New Mexico Oil Conservation Commission. Standard spacing for oil wells is 40 acres, and 160 acres is standard for gas wells. Surface pumps or submersible pumps lift the oil to the surface where it flows through a pipeline to nearby storage tanks. The oil is stored until enough has accumulated to ship either by tank truck or via pipeline.

Special equipment separates the water and gas from the oil. Commercial quantities of gas flow through pipelines to intermediate shipping points. The State of New Mexico does allow, under certain conditions, the flaring or venting of noncommercial quantities of gas.

Waste water disposal can be accomplished in several ways. Fresh water can be discharged into existing drainages or it can be used for beneficial purposes, such as agricultural uses. Brackish water can be pumped into evaporation pits or it can be injected into formations containing water of equal or poorer quality. Occasionally, new wells are drilled for disposal purposes.

When primary oil production declines because of reduced formation pressures, secondary recovery methods may be used to recover additional oil. Injection of water is the most common recovery method currently being used, however, the carbon dioxide tertiary recovery method may also be used. Existing wells in the outer edges of the field are usually converted to injection wells.

Since little is known about the subsurface geology of the area, a conservative projection of one producing well near the Big Hatchet/Alamo Hueco area with related facilities has been assumed. It is assumed the well would be 20,000 feet deep and produce approximately 200-300 barrels of crude oil per day. The oil would be trucked to a local refinery.

Geothermal

Once a geothermal reservoir is discovered, development wells are drilled, roads are built, and various facility sites are constructed. The number of wells drilled is dependent upon several factors, including the type of geothermal resource, temperature, capacity of the wells, reservoir conditions, and topographic characteristics. Insulated aboveground pipelines are constructed to transport the steam or hot water to an electrical power generating plant. Geothermal steam and hot water can only be transported via pipeline about a mile before being significantly affected by cooling. Power plant spacing is usually one plant per several square miles. Power generated by the plant is transmitted via conventional powerlines to the area of use.

At least three deep wells are anticipated with related facilities for geothermal energy in the long-term. Since the development of geothermal energy is uncertain, a conservative projection of one direct utilization of geothermal energy for greenhouse use is assumed in the long-term.

Disposal of waste water is a significant problem. Evaporation pits can be used. Where the waste water quality is toxic, special measures must be taken to protect surface and underground water supplies. Where the waste water quality is high, it can be discharged into existing drainages. Injection is a technique where waste water is pumped into nonproductive zones of the geothermal reservoir.

Abandonment (Oil and Gas and Geothermal)

The depletion of oil and gas and geothermal reservoirs is generally gradual. Wells are plugged, capped, and then marked at the surface for future reference. All equipment is removed. Roads are abandoned and rehabilitated. Surface pipelines and powerlines are removed. If fresh water is encountered, wells may be converted to conventional water wells. When completely dry, reserve pits and evaporation pits are backfilled and reshaped. All drill and facility sites are reshaped. Disturbed sites are usually prepared to provide a suitable seedbed for re-establishing vegetation. Water bars and terraces are constructed as needed to prevent erosion.

Standard Operating Procedures

Site-specific environmental documents will be prepared to assess site-specific impacts of each energy minerals action (e.g., Notices of Intent [NOIs] to conduct oil and gas exploration operations, Application Permits to Drill [APDs], sundry notices and reports on wells, and NOIs to conduct geothermal exploration operations). All surface use standards previously developed also will be used. (Technical Report II contains the environmental review process for leasing and exploration.) The BLM will adhere to procedures to protect all resources on public land. Many procedures are required by various Federal and state laws, regulations, and legislative actions. (A list of sources for standard operating procedures is contained in Technical Report II.) Standard stipulations which are automatically attached to leases are contained in Appendix E-1.

Implementation

If a decision is made to implement the PA, steps must be taken to remove the segregative effects of the Classification and Multiple Use (C&MU) Act on the following areas: Dona Ana Recreation Area, Granite Gap Recreation Area, and Needles Eye Picnic Site (see Overlay 2 for general locations). Leases would be issued with appropriate stipulations in accordance with the decision based on the analysis contained in this document. Existing leases would not be disturbed.

Rangeland Management

The BLM proposes to implement a rangeland management program designed to concentrate management, rangeland developments, and vegetation treatments on those allotments that have a high potential for rangeland improvement and resolution of resource conflicts. The initial livestock forage allocation would be mutually agreed upon between the permittees and BLM and could be up to preference. If adjustments in livestock numbers are found to be necessary through the monitoring, decisions would be issued stating what the adjustments would be and the adjustments would be implemented over a 5-year period following the issuance of the decision. Following consultation with the permittee, BLM proposes to establish the following:

1. proper level of forage utilization;

2. initial stocking rate;

3. the kind of livestock allowed;

4. the period of use;

5. areas to be excluded from livestock grazing;

6. the initial allocation of forage to big game species.

At the end of the monitoring period, the BLM proposes to establish:

1. proper stocking rate;

2. grazing treatments;

3. rangeland developments and vegetation treatments necessary to properly manage the renewable resources of the Resource Area.

Amount of Vegetation Allocated to Grazing and Other Uses

The past 5-year (1977-81) average licensed grazing use indicates that 227,031 Animal Unit Months (AUMs) of forage were authorized for use by livestock annually on public land within the 3-County Area. This data will be used as a basis for negotiating initial livestock grazing allocations beginning in 1985. Initial allocations will be based on consultation with permittees, the Target Group (State Land Commissioner, Range Improvement Task Force, Grazing Advisory Board, and Governor of New Mexico), and the use of other resource data that becomes available. However, the proportion of the rangeland in fair and poor condition indicates that a lower level of livestock grazing may be more appropriate in some areas. Following completion of the Final MFP Amendment/EIS, a Rangeland Program Summary outlining the rangeland management program will be written and distributed to the public before issuing proposed decisions to grazing permittees. Within 17 months after the Final MFP Amendment/EIS is filed and the 30-day comment period is over, all proposed livestock grazing decisions will be issued. After they are issued, monitoring studies would be initiated. If monitoring studies show a need for adjustments, another decision will be issued and the adjustment will be implemented over a 5-year period following the final decision. The 5-year period could be waived if an agreement is reached with the permittee to implement the decision in less than 5 years or the total suspension is 15 percent or less of the authorized active grazing use for the previous year. Since there is a possibility that livestock grazing use may be adjusted to an unknown level below the 5-year average use, a lower level of grazing use of approximately 213,286 AUMs was used for analytical purposes. The projected lower level, or worst case, was determined only for allotments in the improve category (I) (see Appendix F-3 for criteria used in designating categories). It was assumed that no adjustment would be needed on areas in good to excellent ecological condition, a 20 percent downward adjustment on areas in fair condition, and a 35 percent downward adjustment on the areas in poor condition. (Appendix F-6 contains acres of ecological condition by allotment.)

The initial allocation to big game would be 1,917 AUMs. This is 237 AUMs less than the 2,154 AUMs presently allocated. This change is due primarily to present allocations to big game on allotments which have no big game or less than one animal per two sections. Future allocations would be for areas only where the need is justified. There are no wild, free-roaming horses or burros within the 3-County Area, therefore, no forage is allocated to them.

It is anticipated that by the year 2010, the projected allocation would be 257,402 AUMs to livestock and 3,498 AUMs to big game. This would represent an increase of 30,371 AUMs over the present 5-year average licensed use and would be a decrease of 6,842 AUMs from the existing preference. The allocation to big game would be an increase of 1,344 AUMs over the existing allocation.

Table 1-5 shows the existing total allotment acreages, livestock AUMs (preference and 5-year average licensed use), big game AUMs, and the initial proposed allocations to livestock and big game. Table 1-6 indicates proposed forage allocations by alternative. Figures 1-1 to 1-5 indicate graphically the forage allocations under the PA and alternatives.

TABLE 1-5

SUMMARY OF EXISTING ALLOTMENT STATUS, ACREAGE, AND AUM ALLOCATION[a/]

		Acres			Present AUMs Allocated					Proposed Initial Forage Allocations			
Existing Allotment Status	No.	Public	Other	Total	Total AUMs (Private, State, Federal)	Livestock Federal Preference	Controlled AUMs[b/]	Livestock Average Licensed Use (Federal)	Big Game	Total AUMs (Private, State, Federal)	Livestock Federal	Controlled AUMs	Big Game (Federal)
AMP	15	434,551	160,077	594,628	89,558	64,126	25,432	51,695	852	72,137	51,695	20,442	314
Non-AMP	247	1,189,539	755,344	1,944,883	327,693	200,118	127,575	175,336	1,302	280,791	175,336	105,455	1,603
Unallotted	25	7,663	-0-	7,663	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
TOTAL		1,631,753	915,421	2,547,174	417,251	264,244	153,007	227,031	2,154	352,928	227,031	125,897	1,917

Source: BLM Las Cruces District Office Files, 1982.

Notes: a/The figures shown are for allotments within the 3-County Area only.

b/Controlled AUMs are those AUMs on private or state lands which are owned or leased by the permittee.

Method of Grazing Management

Under the PA, livestock grazing would be authorized on all allotments now being grazed. (Refer to Appendix F-1 for detailed allotment information--acreage, ownership, present preference, 5-year average licensed use, and proposed AUM allocation.) Technical Report VIII contains present and proposed allocations by land ownership.

Three levels of grazing management would be implemented throughout the 3-County Area. Similar allotments would be identified as belonging to one of three categories for which the objectives would be to: maintain the allotments' current satisfactory condition (Category M); manage the allotments in a custodial manner, while still protecting existing resources (Category C); or improve the allotments' current unsatisfactory condition (Category I). Appendix F-2 shows the proposed categories for each allotment under consideration. Technical Report VIII contains the dichotomous key used in arriving at M, I, and C categorization.

Category M (Maintain Management Category)

Using criteria shown in Appendix F-3, 164 allotments and parts of 6 others, comprising 447,210 acres, would be designated as Category M. For analysis purposes, 15 of the 164 Category M allotments would be analyzed with their adjacent allotments, of which 13 are in Category I and 2 in Category C. These allotments show mid-fair or better ecological condition, satisfactory forage utilization patterns, and have no known resource conflicts resulting from present livestock grazing. Allotments proposed for Category M do not need major management changes and continuous yearlong grazing use would continue. Rangeland

TABLE 1-6

PROPOSED FORAGE ALLOCATION BY ALTERNATIVES

	Proposed (1989)			Projected (2010)		
	Livestock AUMs	Big Game AUMs	Total AUMs	Livestock AUMs	Big Game AUMs a/	Total AUMs
Proposed Action	213,286 b/	1,917	215,203	257,402	3,498	260,899
No Action	264,244 c/	2,154	266,398	264,244	2,154	266,398
Maximization of Livestock Forage Production	213,286 b/	1,917	215,203	297,765	3,512	301,277
Enhancement of Other Resource Values	155,319 b/	1,917	157,236	228,530	3,498	232,027
Elimination of Livestock Grazing	-0-	d/		-0-	d/	

Source: BLM Las Cruces District Office Files, 1982.

Notes: a/Big game AUMs are calculated for deer, pronghorn, and bighorn sheep. Calculations were not made for ibex and javelina, except under the Elimination of Livestock Grazing Alternative.

b/Estimated worst case allocation. The monitoring studies would be used to determine actual levels of livestock use.

c/This figure is preference. Actual stocking would be closer to the 5-year average of 227,031 AUMs.

d/All AUMs would be available for big game. There would be 11,060 AUMs available for deer, pronghorn, and bighorn sheep, and 1,317 AUMs available for ibex and javelina.

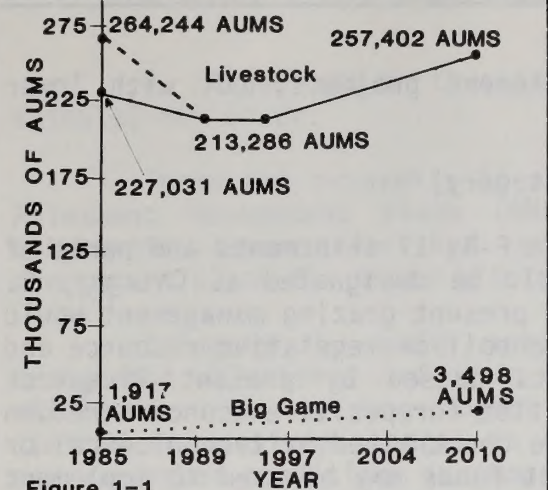


Figure 1-1
Forage Allocation Under Proposed Action

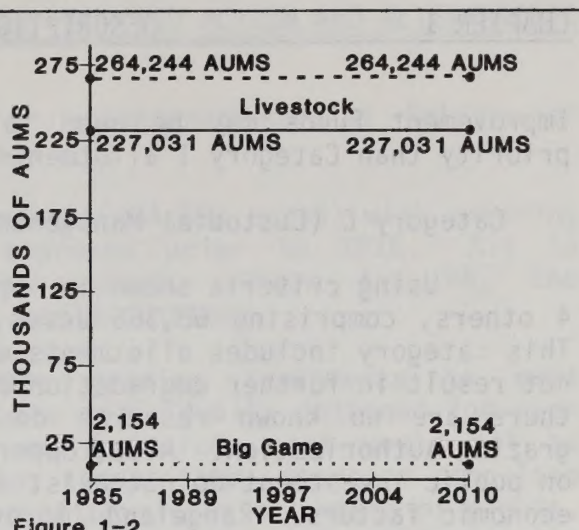


Figure 1-2
Forage Allocation Under No Action Alternative

- - - - - Administrative adjustment from preference.

——— Actual adjustment in livestock use from 5-year average licensed use.

a/ See Appendix D-1 for methodology. These AUM figures reflect areawide game numbers rather than herd areas given in other alternatives.

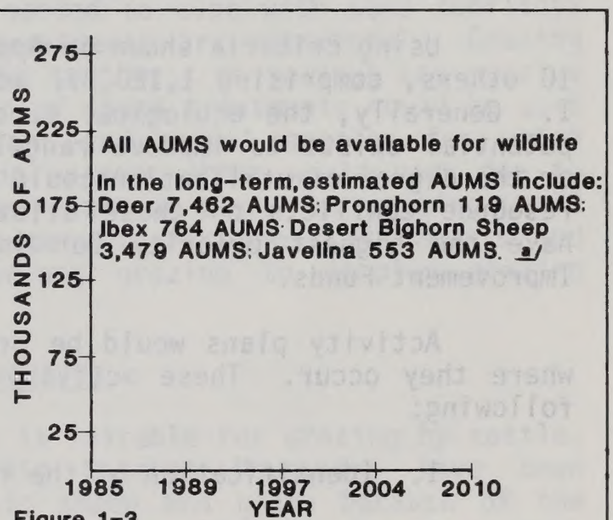


Figure 1-3
Forage Allocation Under Elimination Of Livestock Grazing Alternative

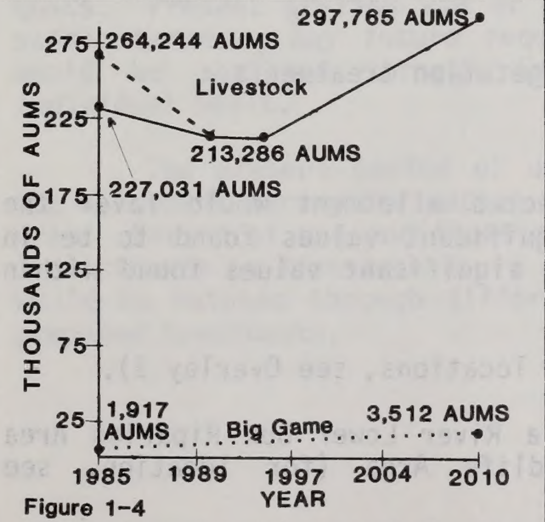


Figure 1-4
Forage Allocation Under Maximization of Livestock Forage Production Alternative

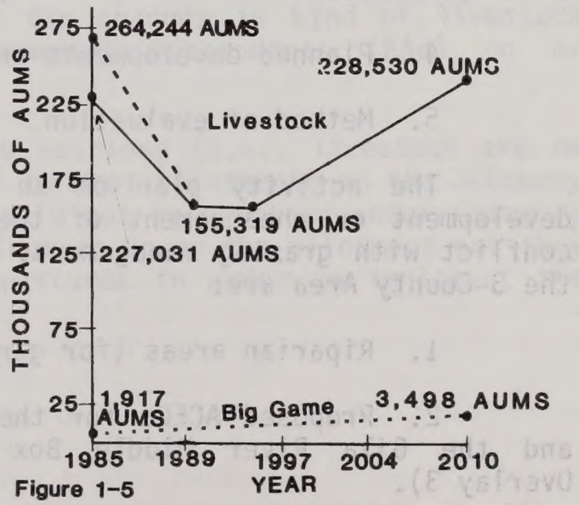


Figure 1-5
Forage Allocation Under Enhancement of Other Resource Values Alternative

SOURCE: BLM Las Cruces District Files, 1982

Improvement Funds may be used to implement projects, but with lower priority than Category I allotments.

Category C (Custodial Management Category)

Using criteria shown in Appendix F-3, 17 allotments and parts of 4 others, comprising 68,366 acres, would be designated as Category C. This category includes allotments where present grazing management would not result in further degradation of the soil or vegetative resource and there are no known resource conflicts caused by present livestock grazing authorization. Also, opportunities for positive economic return on public investment do not exist or are constrained by technological or economic factors. Rangeland Improvement Funds may be used to implement projects, but with lower priority than Category I allotments.

Category I (Improve Management Category)

Using criteria shown in Appendix F-3, 71 allotments and parts of 10 others, comprising 1,120,827 acres, would be designated as Category I. Generally, the ecological condition class is less than desirable, potential exists to improve rangeland conditions, utilization patterns or the degree of utilization could be changed and improved, or there are resource conflicts on these allotments. Category I allotments would have the highest priority for implementing projects using Rangeland Improvement Funds.

Activity plans would be prepared to resolve resource conflicts where they occur. These activity plans would specifically define the following:

1. Identification of the resource conflict.

2. Management goals and objectives.

3. Level of management necessary to achieve the stated goals and objectives.

4. Planned developments and vegetation treatments.

5. Method of evaluation.

The activity plan on an affected allotment would favor the development or enhancement of the significant values found to be in conflict with grazing management. The significant values found within the 3-County Area are:

1. Riparian areas (for general locations, see Overlay 3).

2. Proposed ACECs for the Gila River Lower Box Riparian Area and the Gila River Middle Box Wildlife Area (for location, see Overlay 3).

3. Crucial deer, pronghorn, ibex, and bighorn sheep habitat (see Map 2-1).

4. Areas where threatened or endangered species (plants or animals) may occur.

There are presently 15 allotments (434,551 acres) with existing Allotment Management Plans (AMPs) approved prior to 1975. All 15 allotments have prescribed grazing systems. Under the PA, the management plans for these allotments would continue.

Category I would incorporate grazing treatments to meet management objectives and goals that are individually designed for each allotment. The grazing objectives would include, but would not be limited to, desired changes in species composition, improved rangeland and watershed condition, accommodation of physiological needs of plants, and to realize a beneficial return of dollars expended in achieving the overall management objectives.

Grazing management would be needed to cope with some conflicts and as a follow-up to ensure land treatments are successful. Grazing treatments which have been used in the southwest on various key species are shown below (one or a combination of these treatments could be used on allotments, depending on the plant and animal species for which management is designed). The grazing seasons shown would vary due to precipitation and soil moisture. The resulting plans for grazing would be individually developed with the operator for these allotments and they may vary from continuous yearlong grazing to complex grazing systems.

Period of Use and Kind of Livestock

Generally, the 3-County Area is suitable for grazing by cattle, sheep, goats, and horses. The Big Hatchet Mountains have been classified as unsuitable for domestic sheep and goats because of the presence of desert bighorn sheep. Under the PA, all desert bighorn sheep habitats, including the Peloncillo, Alamo Hueco, and Organ Mountains, would be classified as unsuitable for domestic sheep and goats. Present grazing use of the public land is by cattle and a few saddle horses. Any future requests for changes in kind of livestock would be analyzed through Environmental Assessments (EAs) on an individual basis.

The present period of use is yearlong (i.e., livestock are on the allotment during the entire year) on most allotments in the 3-County Area. Period of use modifications would not be proposed under Category I allotments as livestock would continue to be on the allotment but they would be rotated through different pastures in order to implement the proposed treatments.

Plant Species	Spring (Mar-June)	Summer (July-Oct)	Fall-Winter (Nov-Feb)
Black grama	Graze	Rest	Graze
Sideoats grama	Graze	Rest	Graze
Blue grama	Graze	Rest	Graze
Mesa dropseed	Graze	Rest	Graze
Bush muhly	Rest or graze lightly	Rest	Graze
Vine mesquite	Graze	Graze	Graze
Tobosa	Graze	Graze	Graze
Alkali sacaton	Graze	Graze	Graze
Fourwing saltbush	Rest or graze lightly	Rest	Graze
Winterfat	Rest or graze lightly	Rest	Graze
Mountain mahogany	Rest or graze lightly	Rest	Graze
Desert ceanothus	Rest or graze lightly	Rest	Graze
Annual forbs	Graze when available		
Annual forbs	Rest during late winter and spring on pronghorn habitat		
Riparian	Rest from livestock grazing for a period of 3 to 5 years, then graze no more than every other year		
Soils in critical or severe erosion condition	Rest during growing season (June 1 to October 1)		

(Technical Report VI contains additional information on these grazing treatments.)

Support Facilities

Vegetation treatments as well as rangeland development projects would be implemented on Category I allotments to achieve the objectives of the PA. Since specific grazing treatments have not been designed for each allotment, a comprehensive list of proposed projects is not available. (Appendix F-4 shows proposed projects used for analysis purposes.)

Rangeland development projects consisting primarily of fences and water developments would be required to achieve better livestock distribution patterns and to protect areas which have high values for other resources. The rangeland developments proposed for the 3-County Area under the PA include: 25 dirt tanks, 67 miles of pipeline, 47 drinking troughs, drilling or equipping 11 wells (energy saving windmills would be used where feasible), 1 cattleguard, 17 storage tanks, 68 erosion dikes, 55 miles of fence, and 4 umbrella catchments.

Several herbicides currently labeled and approved by the Environmental Protection Agency and the New Mexico Department of Agriculture for use on rangelands in the State of New Mexico are proposed for use in controlling mesquite or creosote.[1] They are Tebuthiuron (N-(5-(1,1-dimethyl)-1,3,4-triadazol-2-yl)-N,N^1-dimethylurea), a pelletized herbicide, and foliar applied herbicides of either Picloram (4-Amino-3,5,6-trichloropiocolinic acid), Dicamba (3,6-dichloro-o-anisic acid), 2,4,5-T (2,4,5 trichlorophenoxy Acetic Acid), or a combination of one or more of the above. The rate of application by herbicide and vegetation species follows (*AI/Ac-Active ingredient per acre):

Species	Chemical	Rate of Application
Mesquite	All Liquid Formulations	.25-.50 lb. AI/Ac*
Mesquite	Tebuthiuron	.50-1.25 lbs. AI/Ac
Creosote	Tebuthiuron	.50-.75 lb. AI/Ac

Only Federal and state registered herbicides approved for use on rangelands would be used on public land. Dowco 290 is currently being evaluated by the State of New Mexico and could be used when and if labeled. If other herbicides effective on mesquite or creosote are approved prior to the proposed vegetation treatment, they would be considered for use.

Vegetation treatments are proposed for approximately 51,888 acres in the 3-County Area. Chemical treatment is proposed for 9,609 acres of mesquite and for 42,279 acres of creosote. Table 1-7 shows the allotments, acreage, and the anticipated increase in forage production of the proposed vegetation treatments and Map 1-2 shows the location of the treatment areas by species and methods proposed for treatment.

A site-specific EA would be prepared prior to any vegetation treatment to determine the site-specific impacts. Methods used during the application of herbicides are more specifically described in Appendix B-1, Guidelines for Vegetation Treatments.

Monitoring, Evaluation, and Adjustment of the Proposed Action

Monitoring of the Category I allotments would be necessary to determine the livestock grazing capacity, the effectiveness of the grazing treatments, and the effectiveness of the vegetation treatments and rangeland developments. Permittees and the Target Group would be contacted and informed of the procedures which would be used prior to initiating the monitoring studies and would be invited to participate in the process.

TABLE 1-7

SUMMARY OF PROPOSED VEGETATION TREATMENTS ON PUBLIC LAND (PROPOSED ACTION AND ENHANCEMENT OF OTHER RESOURCE VALUES ALTERNATIVE)

Allotment Number	Chemical Treatment (Acres)[a/] Creosote	Mesquite	Total Acres Treated	Additional AUMs Available to Livestock Through Treatment
1008	138	0	138	9
1032	1,853	0	1,853	123
1041	7,487	0	7,487	499
1044	2,314	211	2,525	181
1063	2,033	0	2,033	135
1076	1,037	0	1,037	107
1078	1,313	4,998	6,311	932
2027	26,104	4,400	30,504	2,461
TOTAL	42,279	9,609	51,888	4,447
ESTIMATED COST PER ACRE	$16.00	$5.00 - $24.00		
ESTIMATED TOTAL COST	$676,464	$48,045 - $230,616		

Source: BLM Las Cruces District Office Files, 1982.

Note: a/Acreages are included in the table of Vegetation Treatments for the Maximization Alternative.

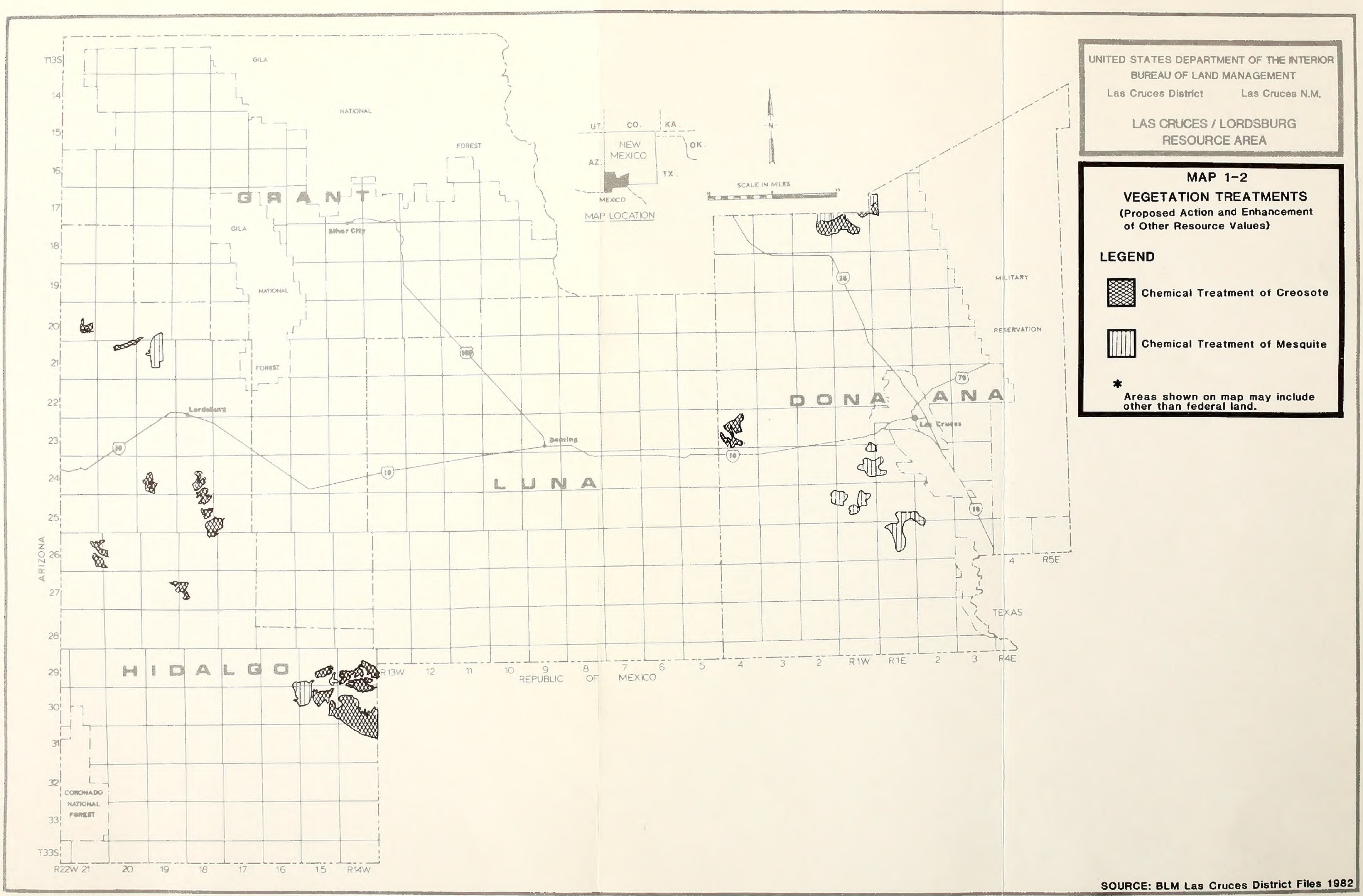
As a minimum, the monitoring studies would be designed to collect data on actual livestock use, wildlife use, degree of key forage species utilization, climatic conditions, and rangeland ecological condition and trend. Proper forage utilization would vary depending on the key forage species and season of use, however, in no instance would it be more than 60 percent of the current year's growth.

All allotments proposed for Category I would be monitored (see Appendix F-2, Proposed Management Categories by Allotment). The number and frequency of studies per allotment would be determined by local conditions and BLM's budgetary constraints. The allotments proposed for Categories M and C would be inspected periodically to determine if the principal objectives are being met.

The detailed techniques to be used in the monitoring studies would vary depending on the data needed. The following techniques or variation thereof would be used to collect data for each critical element:

1. Actual use

   a. Livestock counts



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces N.M.

LAS CRUCES / LORDSBURG
RESOURCE AREA

MAP 1-2
VEGETATION TREATMENTS
(Proposed Action and Enhancement of Other Resource Values)

LEGEND

▩ Chemical Treatment of Creosote

▥ Chemical Treatment of Mesquite

* Areas shown on map may include other than federal land.

SOURCE: BLM Las Cruces District Files 1982

GILA
NATIONAL
FOREST
GRANT
GILA
NATIONAL
FOREST
Silver City
Lordsburg
Deming
LUNA
DONA ANA
Las Cruces
HIDALGO
MILITARY
RESERVATION
TEXAS
ARIZONA
REPUBLIC OF MEXICO
CORONADO
NATIONAL
FOREST
UT. CO. KA.
NEW MEXICO
AZ.
OK.
TX.
MEXICO
MAP LOCATION
N
SCALE IN MILES
15
10
180
25
70
T13S
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
T33S
R22W 21
20
19
18
17
16
15
R14W
R13W
12
11
10
9
8
7
6
5
4
3
2
R1W
R1E
2
3
R4E
4
R5E

   b. Wildlife counts or pellet transects by habitat areas
   c. Actual use cards supplied by operator

2. Utilization of key forage species
   a. Portable cages
   b. Permanent transects
   c. Temporary transects

3. Climatic conditions
   a. Rain gauges
   b. U.S. Weather Bureau statistics

4. Rangeland condition and trend
   a. Exclosures
   b. Permanent photo points
   c. Vegetation composition and production transects
   d. Browse utilization transects

Adjustments in livestock numbers due to drought or other emergencies would be accomplished under existing regulations and BLM Manual Section 4413 guidelines. Monitoring studies would also be designed to measure wildlife populations and browse utilization.

If monitoring shows the management objectives are not being met, the cause would be determined and corrective action would be taken. In allotments where monitoring shows an overall increase in forage production, additional livestock use may be authorized consistent with other resource needs. The change in grazing use would be authorized as temporary until monitoring studies confirm the change on a sustained basis. Only after intensive studies indicate additional perennial vegetation is available will consideration be given to an increase in permanent livestock numbers.

During periods of drought (documented by precipitation data) or other emergencies such as fire, adjustment in livestock numbers would be made to protect the vegetation and soil resources. Whenever adjustments are needed, the permittees would be contacted and an attempt would be made to arrive at mutually agreed upon adjustments. If this were not possible, needed adjustments would be put into effect by BLM decision.

Maintenance of Rangeland Developments

Maintenance of rangeland developments on public land is subject to policies and guidance contained in Washington Office Instruction

Memorandum 83-27. Livestock water facilities, fences, and cattleguards constructed primarily for livestock management would be routinely maintained by permittees unless specific arrangements are made to the contrary. The permittee's obligation would be periodic inspections, routine maintenance, and reporting of major damage, malfunction, or complete system failure.

Standard Operating Procedures

When rangeland developments and vegetation treatments are implemented on public land, the BLM will adhere to procedures and design specifications listed below to protect resources as mandated by certain laws, executive orders, manual requirements, and policies. This MFP Amendment/EIS analyzes cumulative impacts of proposed rangeland developments and vegetation treatments. However, prior to implementation, site-specific EAs would be prepared to analyze the site-specific impacts from projects once they are located on-the-ground.

1. Roads or trails would be constructed only where existing roads and trails could not be used or where off-road travel is not possible because of topography or terrain.

2. Disturbance of soil and vegetation at all project sites would be held to a minimum.

3. Construction of all fences would be in accordance with design constraints in BLM Manual Section 1737.

4. Areas of soil disturbance would be reclaimed.

5. A mixture of seeds of species adaptable to the area would be used where seeding is done following construction of rangeland development projects or vegetation treatments. The time and method of seeding prescribed by BLM policy will be used to achieve the best results for the intent of the seeding. A typical seed mixture which could be used on sandy loam sites within the lower elevations of the Resource Area is:

Species	Pounds of Seed Per Acre	
	Drilling	Broadcasting
Black grama	1 1/2	3
Fourwing saltbush	3 1/2	7
Sideoats grama	5	10
Lehmann lovegrass	1/8	1/4
Globemallow	1/4	1/2

Other forb species would be considered if a good source is available. Livestock grazing would be excluded from all newly seeded areas for a minimum of two growing seasons to allow seedlings to become established. Grazing may be allowed between the first and second growing season. This would not apply to small areas such as pipelines.

6. Soil maps and the BLM soil scientist would be consulted to determine areas where construction projects would have the greatest impacts (e.g., areas on steep slopes and soils in critical or severe erosion condition class would be avoided).

7. A threatened, endangered, state listed, or sensitive species clearance will be conducted by an appropriate BLM staff biologist prior to the beginning of any project. If a "may affect" determination is made by the staff biologist, consultation will be undertaken with the Fish and Wildlife Service, New Mexico Department of Game and Fish, or the New Mexico State Heritage Program listing the species which may be affected. The results of the consultation will determine the course of action necessary to avoid adverse effects on listed species.

8. During nesting season, a raptor inventory would be conducted on areas proposed for vegetation treatment to identify and flag land within a ¼ mile radius of active nests so they would not be disturbed by the proposed treatment.

9. New or expanded grazing use and support facilities would be evaluated on a case-by-case basis so that impairment of crucial wildlife habitat would be minimized.

10. Lands under wilderness review would be managed in a manner that would not impair the area's suitability as wilderness according to policy guidelines identified in BLM's Interim Management Policy and Guidelines for Land Under Wilderness Review (1979).

11. BLM would conduct intensive (Class III) cultural inventories on areas where surface disturbance would occur during project implementation. If historic or cultural properties are identified, every effort would be made to avoid adverse effects. However, where that is not possible, BLM would consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation in accordance with the Programmatic Memorandum of Agreement (PMOA) between the BLM, the Council, and the National Conference of State Historic Preservation Officers, dated January 14, 1980.

12. Visual resources will be considered as part of site-specific EAs prior to construction of all proposed rangeland developments and implementation of grazing management treatments. If appropriate, mitigating measures would be developed on a case-by-case basis. (See Map 2-8.)

13. All refuse would be removed from work areas on public land and be disposed of in approved sanitary landfills.

14. Where BLM controls the water sources, water would be made available to wildlife when livestock are off the allotments or pastures.

15. Escape ramps would be required in all water troughs and open storage tanks.

16. Total removal of thickets in riparian areas would not be allowed.

17. The use of chemical herbicides will follow the vegetation treatment guidelines in Appendix B-1. There is no evidence that chemical vegetation treatments are hazardous to human health or other organisms when used in strict accordance with the Environmental Protection Agency approved labeled instruction. Commercial formulations, however, contain a highly toxic contaminant, the dioxin 2,4,7,8 tetrachlorodibenzo-p-dioxin (TCDD), which occurs in minute amounts, but which poses no threat to human health when 2,4,5-T is used in rates as recommended on the product label. TCDD dissipates rapidly in the environment, does not accumulate in natural systems or food chain, and does not create further quantities of dioxin as it decomposes. The herbicide 2,4,5-T can be used safely with dioxin contents as high as 0.1 part per million, a much higher ratio than that found in commercial formulations as they are currently applied. Technical Report VI contains further information on the toxicity of the chemical herbicide 2,4,5-T to human health.

Implementation Schedule

Following a decision on the MFP Amendment/EIS, livestock permittees and the Target Group would be consulted on an allotment-by-allotment basis to establish the initial level of livestock use, rangeland developments, vegetation treatments, and grazing treatments. (Refer to Appendix A for consultation policy and guidelines.) Livestock adjustments on Category I allotments made at the end of the monitoring period would be of sufficient magnitude to ensure a positive vegetative response or maintenance of satisfactory conditions.

Implementation of rangeland developments, vegetation treatments, and grazing treatments under the PA would occur over a nine-year period. The implementation schedule may change over time due to possible budget fluctuations, policy and procedural changes, and consultation with affected individuals.

Proposed Special Designation Areas

Three Areas of Critical Environmental Concern (ACECs) are proposed for the Resource Area--the Gila River Lower Box Riparian Area, the Gila River Middle Box Wildlife Area, and the Organ Mountains Scenic Area. (See Overlay 3 for general locations.)

The Gila River Lower Box Riparian ACEC would be designated on 2,469 acres. The objectives of the Gila River Lower Box Riparian ACEC management plan are:

1. To protect and improve riparian vegetation which provides habitat for:

a. nine Federal or state-listed endangered species;

b. an avifauna which is one of the most diverse in the Southwest;

c. diverse mammalian and reptilian communities which represent half the known mammals and reptiles in the state;

d. a warm water fisheries resource consisting of both native and non-native fishes.

2. To manage the public land to maintain and improve water quality to meet state standards for fecal coliform count, dissolved oxygen, pH, and temperature.

3. To maintain and improve channel stability.

4. To maintain the recreation and cultural resources by:

a. protecting and interpreting the petroglyph panels and rock shelters present in the area;

b. preserving scenic values;

c. preserving primitive recreation opportunities.

5. To allow cattle grazing to the extent that it is compatible with the other objectives.

(The complete text of the Gila River Lower Box Riparian ACEC management plan is contained in Technical Report III.)

The Gila River Middle Box Wildlife ACEC would be designated on 647 acres. The objectives of the Gila River Middle Box Wildlife ACEC management plan are:

1. To maintain the proper aquatic habitat for two state listed fish species.

2. To maintain cliff habitat for nesting raptors, other birds, and bats.

3. To preserve the scenic and recreation values of the Gila River Middle Box.

4. To preserve the downstream riparian community.

5. To maintain and improve water quality to meet state standards for fecal coliform count, pH, dissolved oxygen, and temperature.

(The complete text of the Gila River Middle Box Wildlife ACEC management plan is contained in Technical Report III.)

The Organ Mountains Scenic ACEC would be designated on 8,947 acres. The objectives of the Organ Mountains Scenic ACEC management plan are to protect, prevent irreparable damage to, and enhance the scenic values of the Organ Mountains. The ACEC would be managed as a VRM Class I.

(The complete text of the Organ Mountains Scenic ACEC management plan is contained in Technical Report III.)

No Action (NA) Alternative

Energy Minerals

The NA Alternative proposes no change in current management practices with regard to leasing. The LCLRA currently has 10 areas designated NOL (108,460 acres). Areas open to leasing with special stipulations total 564,677 acres. (See Overlay 2 for general locations.) The remainder of the Federal mineral estate (3,144,624 acres) in the Resource Area is open to leasing with no special stipulations attached to the leases. As described in the PA, standard operating procedures for energy minerals leasing and associated exploration, development, production, and abandonment operations would apply. Table 1-2 is a summary by alternative of the leasing status.

Implementation of this alternative would require no new action on the part of BLM. Leases would continue to be issued with appropriate environmental protection stipulations or denied in accordance with existing decisions.

Rangeland Management

Under the NA Alternative, current livestock management practices would continue and livestock forage allocations would be maintained at the present preference of 264,244 AUMs, although it is not expected that the actual use would exceed the 5-year average of 227,031 AUMs. Forage allocation to big game would remain at 2,154 AUMs. Table 1-6 and Figure 1-2 show forage allocation under the NA Alternative.

Implementation of the NA Alternative would entail the following:

1. The 15 allotments (434,551 acres) which are currently under approved implemented AMPs would be managed intensively, while those not under AMPs (1,189,539 acres) would be managed as they are at present. No new grazing management systems would be designed or implemented.

2. Monitoring studies of actual use, key species utilization, rangeland condition and trend, and climatic conditions would continue to be conducted only on those allotments under existing AMPs.

3. No new Bureau initiated rangeland developments or vegetation treatments would be implemented in direct support of the grazing program. Range Betterment Funds presently used for rangeland developments would continue to be expended. The existing policy as set forth in Washington Office Instruction Memorandum 83-27 on

operator-built rangeland developments would continue. Funds for wildlife and watershed projects will continue to be expended upon completion of resource activity plans.

Maximization (MAX) of Energy Minerals Leasing and Livestock Forage Production Alternative

Energy Minerals

The MAX Alternative would maximize opportunities for energy minerals leasing and associated exploration, development, production and abandonment operations in the LCLRA subject to appropriate environmental protection stipulations.

The Federal mineral estate in the Resource Area, 3,817,761 acres, would be open to energy minerals leasing with no special restrictions or stipulations attached to the lease. As described in the PA, standard operating procedures for energy minerals leasing and associated exploration, development, production, and abandonment operations would apply. The areas and acreages are listed in Table 1-2.

Implementation of the MAX Alternative would entail the following:

1. The segregative effects of the classification under the Classification and Multiple Use (C&MU) Act would be removed on the following areas: Baylor Recreation Area, Dona Ana Recreation Area, Granite Gap Recreation Area, Organ Mountain Recreation Area, Fort Cummings, Needles Eye Picnic Site, and Massacre Peak.

(Note: White Sands Missile Range (WSMR) has been excluded from analysis in this MFP Amendment/EIS. The area will be considered in a separate withdrawal review scheduled to begin in 1983.)

2. The implementation of this alternative in WSAs and other lands under wilderness review would be delayed until Congress has made a final decision to drop these areas from further wilderness review. Areas dropped from the wilderness review would be open to energy minerals leasing with no special restrictions or stipulations. If an area is designated as Wilderness, leases must contain reasonable stipulations for the protection of wilderness values.

Rangeland Management

For Rangeland Management, allotment Categories M, I, and C as described in the PA would apply. The MAX Alternative would initiate an intensive program of rangeland management designed to achieve maximum forage production for livestock. Vegetation treatments would be implemented on 880,997 acres to convert existing areas dominated by mesquite or creosote to more desirable livestock forage (see Map 1-3). Rangeland developments proposed for the 3-County Area under the MAX Alternative include: 49 dirt tanks, 224 miles of pipeline, 145 drinking troughs, drilling or equipping 46 wells (energy saving windmills would be used where feasible), 4 cattleguards, 48 storage tanks, 94 erosion dikes, 192 miles of fence, and 4 umbrella catchments. (See Appendix F-5 for proposed rangeland developments by allotment under the MAX Alternative.)

The initial authorized livestock AUMs would be the same as the proposed initial stocking rate under the PA (227,031 AUMs). Through the proposed vegetation treatments, anticipated forage allocation to livestock is projected to increase to 297,765 AUMs in the long-term. Initial and projected long-term forage allocations to big game would be 1,917 AUMs and 3,512 AUMs, respectively. Table 1-6 and Figure 1-4 show the forage allocation under the MAX Alternative.

Implementation of the MAX Alternative would entail the following:

1. Initial allocation in authorized livestock numbers would be made on an allotment-by-allotment basis as under the PA.

2. Chemical vegetation treatments would be applied to 875,767 acres presently dominated by mesquite and creosote in the Resource Area. Chemical treatment would be applied to 412,951 acres of mesquite and 462,816 acres of creosote in the Resource Area. (For discussions of Tebuthiuron and Dowco 290 in Dona Ana County, see the Southern Rio Grande Grazing EIS, 1981.) Mechanical treatment would be applied by rootplowing 5,230 acres of creosote, tarbush, and mixed desert shrub. The areas would be reseeded with a suitable seed mixture. Table 1-8 shows by allotment the proposed treatments and the estimated additional available AUMs. Map 1-3 shows the location of the treatment areas, species to be controlled, and proposed treatment methods. Appendix B-1 contains the guidelines which would be used in the vegetation treatment program.

3. Monitoring studies would be initiated to determine the effects of the vegetation treatments and management systems. These studies would consist of actual use, key forage species utilization, browse utilization studies, rangeland condition and trend, and precipitation.

Enhancement of Other Resource Values (EORV) Alternative

Energy Minerals

Under the EORV Alternative, seven areas would be designated as NOL, totaling 16,960 acres. To enhance other resource values, special stipulations as discussed in the PA would be attached to leases where present values warrant protection or enhancement; this involves 680,914 acres.

In each case where a special stipulation is proposed, the area is specifically described and reasons for the restriction are given (Technical Report II contains the legal descriptions of each area and Appendix E-1 contains the rationale). Table 1-2 is a summary by alternative of the areas, stipulations, and acreages involved. Overlays 2 and 3 show the general locations of these areas.

TABLE 1-8

SUMMARY OF PROPOSED VEGETATION TREATMENTS ON PUBLIC LAND MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE[a/]

Allotment Number	Chemical Treatment (Acres)		Mechanical Treatment (Acres)			Additional AUMs Available to Livestock Through Treatment
	Creosote	Mesquite	Tarbush	Creosote	Mixed Desert Shrub	
Hidalgo County						
1001	3,917					269
1003		365				32
*1006	2,896					193
1008	1,563					104
1009	9,017	970				981
1010	781					52
1012	4,087					272
1014		5,329				840
1015		1,358				320
1016				278		56
1017		2,032				179
1018	706	538				122
1019	1,101					73
1021	1,143					76
1024	2,044					136
1025	1,727					115
1026		2,979				1,176
1030	3,582					239
1031	231					15
1032	1,853	468				190
1033	130					9
1034	576	4,194				679
1035	2,402					178
1038	2,761					292
*1041	7,487					499
1042	3,284					219
1043	477					32
*1044	2,161	211		152	735	334
1048	4,174					337
1052	1,562					104
1053	2,298		477			248
1056	3,330	760				289
1057	2,423					162
1058	1,805					120
1060	2,307					154
1061	744					50
1062	5,719					381
1063	2,252					150
1065	190					13
1068	358					24
1069	7,530					502
1071	560	225				125
1072	1,155					77
1073	1,353	67	83			116
1074	1,046		51			80
1076	817			220		134
1077	276					18
1078	1,313	4,998				933
2022	19,091	2,751				2,096
1510	648	363				94
2024	8,264					1,104
*2027	51,211	6,008	2,676	558		5,047
2045	991					66
Luna County						
2003	6,097					406
*2004	5,373	2,073				684
2005	1,242					83
2006	30,205					2,013
2007	166	1,677				275
2008	556	2,021				355
2009	1,325					229
*2013-2535	24,460	2,809				2,072
*2014	7,268					485
2015	2,473					165
2016	1,770					118
2017	10,973					935
2018	1,997					133
2019	5,117	2,711				699
2020	970	145				186
2026	1,602					107
2028	385	313				75
2030	3,364					239
2032	6,159					563

TABLE 1-8 (concluded)

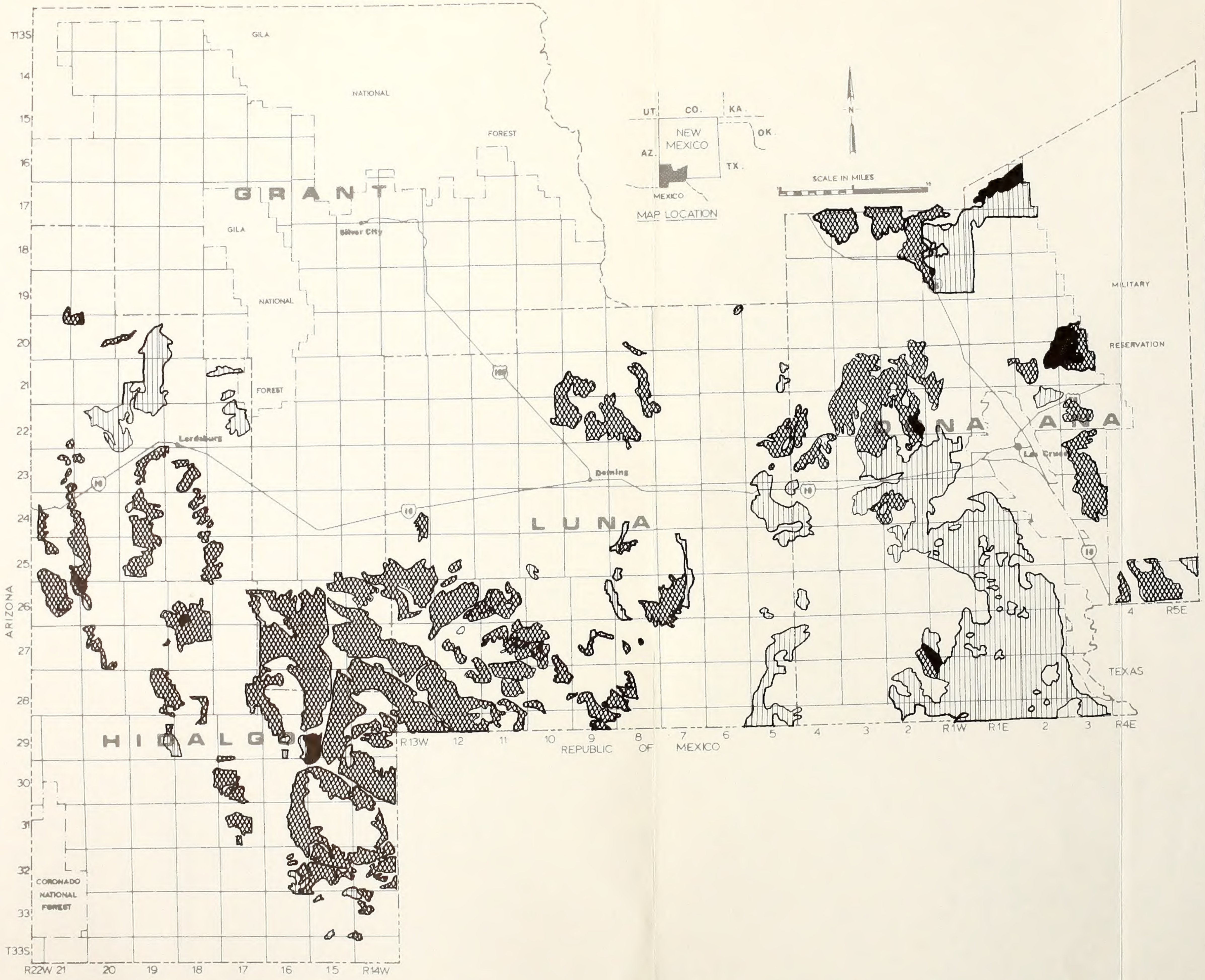
Allotment Number	Chemical Treatment (Acres)		Mechanical Treatment (Acres)			Additional AUMs Available to Livestock through Treatment
	Creosote	Mesquite	Tarbush	Creosote	Mixed Desert Shrub	
Luna County (continued)						
2033	8,460	303				603
*2034	29,958					2,828
2035	978	754				183
2036	6,130					521
2038	3,765					251
*2040	7,066					483
2041	531	1,538				224
2042	3,181					212
*2046	5,724					826
2047	358					24
2528	271					14
3028	7,017					476
Grant County						
*2010	5,433					262
*2011	9,742					649
2023	82,334	792				6,700
2044	4,969					331
Summary						
3-County Area Total	462,816	48,752	3,287	1,208	735	44,515
Dona Ana County Total		364,199 b/				56,430 b/
Resource Area Total	462,816	412,951	3,287	1,208	735	100,945
Estimated Cost Per Acre	$16.00	$5.00-$24.00		$60.00		
Estimated Total Cost	$7,405,056	$2,084,490 -$10,005,522	$197,220	$72,480	$44,100	

Source: BLM Las Cruces District Office files, 1982.

Notes: *Indicates allotments with AMPs.

a/Acres figures include treatment areas from the proposed action.

b/For a breakdown the AUMs by allotment see the Southern Rio Grande EIS, 1981. Allotments included are 2002, 2031, 3001, 3002 3003, 3008, 3013, 3016, 3020, 3022, 3023, 3028, 3029, 3033, 3038, 3039, 3041, 3044, 3045, 3046, 3048, 3052, 5001, 5007, 5010, 6032, 6062, and 6146.


T13S
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
T33S
GILA
NATIONAL
FOREST
GRANT
GILA
Silver City
NATIONAL
FOREST
Lordsburg
Deming
LUNA
HIDALGO
DONA ANA
Las Cruces
MILITARY
RESERVATION
TEXAS
ARIZONA
CORONADO
NATIONAL
FOREST
UT.
CO.
KA.
NEW
MEXICO
OK.
AZ.
TX.
MEXICO
MAP LOCATION
N
SCALE IN MILES
10
180
10
R13W
12
11
10
9
8
7
6
5
4
3
2
R1W
R1E
2
3
R4E
4
R5E
REPUBLIC OF MEXICO
R22W 21
20
19
18
17
16
15
R14W

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces N.M.

LAS CRUCES / LORDSBURG
RESOURCE AREA

MAP 1–3
VEGETATION TREATMENTS
(Maximization of Livestock Forage Production)

LEGEND

▩ Chemical Treatment of Creosote

▥ Chemical Treatment of Mesquite

■ Mechanical Treatmentment of Creosote, Tarbush, and Mixed Desert Shrub.

* Area on map may include other than federal land.

SOURCE: BLM Las Cruces District Files 1982

The remainder of the Federal mineral estate in the Resource Area, 3,119,887 acres, is open to energy minerals leasing with no special restriction or stipulation other than those required under the standard operating procedures.

Implementation and standard operating procedures are the same as discussed under the PA.

Rangeland Management

Allotment Categories M, I, and C as described in the PA would apply. Under the EORV Alternative, livestock grazing would be reduced in the short-term approximately 30 percent from the PA to enhance wildlife habitat, protect watersheds, and reduce impacts on soils and cultural values. The initial allocation would be 227,031 AUMs, but at the end of the monitoring period, the allocation would be approximately 155,319 AUMs. The initial allocation to big game would be 1,917 AUMs.

To achieve this level of use, livestock grazing would be eliminated on a total of 12,921 acres due to riparian habitat in poor or fair ecological condition or watershed in critical or severe erosion classes. In addition, livestock grazing would be reduced 50 percent from the PA on 499,614 acres of rangeland in poor ecological condition and reduced 25 percent on 828,980 acres in fair ecological condition on allotments in all categories. Table 1-9 shows the additional rangeland developments and grazing adjustments under the EORV Alternative.

Rangeland developments and vegetation treatments would be implemented (as in the PA) to improve livestock forage, watershed values, and wildlife habitat. Under the EORV Alternative, projected 2010 allocations under the PA would not be reached due to the lower worst-case projections. In figuring 2010 projections, allotments with acres in fair ecological condition were reduced 10 percent and acres in poor ecological condition 20 percent. Allotments with acres in poor and fair ecological condition were reduced 15 percent. As the rangeland ecological condition and trend improved over the long-term, livestock forage allocations would be increased as conditions warranted. It is anticipated that by the year 2010 livestock forage allocation would be 228,530 AUMs and big game forage allocations would be 3,498 AUMs. Table 1-6 and Figure 1-5 show forage allocation under the EORV Alternative.

Monitoring studies as discussed under the PA would be initiated under the EORV Alternative.

Elimination of Livestock Grazing (ELG) Alternative

Under the ELG Alternative, all domestic livestock grazing on public land would be discontinued. All forage produced on public land would be available for wildlife, watershed, and aesthetics.

TABLE 1-9

ADDITIONAL RANGELAND DEVELOPMENTS AND GRAZING ADJUSTMENTS UNDER THE ENHANCEMENT OF OTHER RESOURCE VALUES ALTERNATIVE

Fencing of Dirt Tanks[a]

Allotment Number	Miles of Fence	Cost/Mile	Total Cost
1010	.25	$4,000	$1,000
1014	.25	$4,000	$1,000
2022	.25	$4,000	$1,000
2023	.50	$4,000	$2,000
4530	.25	$4,000	$1,000
2040	.25	$4,000	$1,000
2013	.50	$4,000	$2,000
TOTALS	2.25		$9,000

Fencing of Riparian Areas[a]

Allotment Number	Acres	Miles of Fence	Cost/Mile	Total Cost	Livestock AUMs Reduced
1007	145	3.5	$4,000	$14,000	34
1016	150[b]	.5	$4,000	$ 2,000	16
1047	99	3.5	$4,000	$14,000	25
1051	72	2.0	$4,000	$ 8,000	7
1059	22	.5	$4,000	$ 2,000	1
1078	434[b]	9.75	$4,000	$39,000	20
3028	29	.5	$4,000	$ 2,000	7
4528	53	2.5	$4,000	$10,000	13
TOTALS	1,004	22.75		$91,000	123

Fencing of Watersheds in Severe or Critical Erosion Class[a]

Allotment Number	Acres	Miles of Fence	Cost/Mile	Total Cost	Livestock AUMs Reduced
1016	2,509	0[c]	$4,000	0	288
1028	2,605	0[c]	$4,000	0	288
1078	6,803	5.5	$4,000	$22,000	1,270
TOTALS	11,917	5.5		$22,000	1,846

Source: BLM Las Cruces District Office Files, 1982.

Notes: a/In addition to the Proposed Action, short-term acres disturbed would be 7.75 and long-term disturbance would be 1.55 acres. Acres disturbed on fencing of riparian areas are included under the PA.

b/These areas are also identified as critical soils areas and are not included in teh total for fencing of watersheds in severe or critical erosion class table.

c/Existing fences will be used.

Funds for the rangeland developments would be limited to those which benefit wildlife or watershed or for the protection of other resources. Table 1-6 and Figure 1-3 show the vegetation allocation under the ELG Alternative.

Implementation of the ELG Alternative would entail the following:

1. Livestock grazing would be eliminated on 1,624,090 acres of public land, and 264,244 AUMs of grazing preference would be cancelled.

No new grazing systems would be implemented, and those with AMPs would be cancelled.

2. State and private lands intermingled with public land would have to be grazed in a manner to avoid livestock trespass on public land. The livestock operator would be responsible for avoiding trespass on public land. This could be accomplished by herding their livestock or by fencing state and private lands. Trailing permits would be issued to authorize livestock to travel across public land to national forest, state, or private lands.

3. No rangeland developments or vegetation treatments would be implemented or maintained unless needed for other BLM activities, such as wildlife and watershed. Rangeland developments which would serve no useful purpose under the ELG Alternative would be removed from public land. These developments would consist of internal fences which interfere with big game movements, corrals, etc. These types of developments were constructed specifically for livestock management and would be of no use if livestock grazing were discontinued.

AUTHORIZING ACTIONS

Energy Minerals

Leases are issued under the authority of the Mineral Leasing Act of February 25, 1920, as amended (44 Stat. 437, 30 USC 181 et. seq.), the Mineral Leasing Act for Acquired Land of August 7, 1947 (61 Stat. 193; 30 USC 351-359), and the Geothermal Steam Act of 1970 (84 Stat. 1566; 30 USC 1001-1025). Regulations implementing these actions are contained in Title 43, Code of Federal Regulations (CFR), Parts 3100 and 3200.

The issuance of a lease does not give the lessee the right to develop at will. After a lease is issued, all subsequent activities on that leasehold are authorized by the Minerals Management Service (MMS). Before approval of any surface disturbing activities, the MMS must prepare a site-specific environmental assessment (in consultation with BLM) of the lessee's proposed plan of operation. It is this site-specific assessment and on-the-ground field inspection which identify potential impacts and the measures to be required of the lessee to mitigate those impacts. The environmental assessment process and the development of mitigating (and reclamation) measures is repeated for each successive development phase in an energy minerals program (i.e., exploration drilling, development, production, and abandonment). A summary of the environmental assessment process is contained in Technical Report II.

Rangeland Management

Each permittee would be issued a term permit through the Las Cruces District Office. The permit would specify the allotment, period of use, and numbers and kind of livestock. Permits to graze in excess of the authorized use would be issued at the discretion of the Area Manager during periods when additional forage is available.

Grazing use above the limits set by the permit without authorization would be considered trespass, and action would be taken by BLM in accordance with regulations in 43 CFR 4150.

INTERRELATIONSHIPS

BLM's management of public land in the Resource Area is related to projects or management practices of other Federal and state agencies and, to an extent, private enterprise.

Since BLM manages a large percentage of the total land in the Resource Area, its management practices strongly influence state and private lands interspersed with public land. The various land managing agencies must coordinate closely to accomplish goals and avoid resource use conflicts.

Federal Programs

U.S. Fish and Wildlife Service (FWS)

The FWS is responsible for conducting predator and rodent control on public land when authorized by BLM. Permittees report instances of predation to the FWS for documentation of livestock losses. All requests for predator control are incorporated into a district animal damage control (ADC) plan and accompanying map which authorizes the FWS to carry out a predator control program.

Rodent control on public land is requested by the permittee to the FWS. Rodent control requests are then evaluated by the BLM, FWS, New Mexico State Department of Agriculture, and New Mexico Department of Game and Fish to determine rodent densities and rangeland condition classes. Rodent control on public land is authorized by the BLM in the ADC plan.

Consultation with the FWS is required before any project initiated or approved by the BLM is implemented that may affect any Federally threatened, endangered, or sensitive plant or animal or their habitat. This consultation is required by Section 7 of the Endangered Species Act of 1973. Consultation may be formal or informal, depending on the degree of disturbance caused by the projects. This MFP Amendment/EIS is considered a major project and formal consultation has been initiated. No biological opinion has been rendered at this time. (Refer to Appendix D-2 for letters of consultation.)

Soil Conservation Service (SCS) and Agricultural Stabilization and Conservation Service (ASCS)

The ASCS and SCS provide assistance to landowners who want to improve their private rangelands. The ASCS provides cost-sharing of fences, water developments, erosion control, and vegetation treatment projects while the SCS provides the technical support in planning, surveying, and designing the projects. The SCS also assists permittees in designing ranch plans for ranches on private land. The primary objective of these ranch plans is to achieve the landowners' soil and water conservation objectives. Coordination between BLM and SCS would be essential where Category I allotments and monitoring is proposed.

A National and State Memorandum of Understanding (MOU) between the U.S. Forest Service, BLM, and SCS outlines each agency's responsibilities for coordination.

Minerals Management Service (MMS)

Surface disturbance associated with oil and gas and geothermal operations would affect the implementation of the PA or alternatives. BLM is assigned responsibilities for environmental protection on mineral leasing activities and after leasing, environmental protection becomes a cooperative effort between BLM and MMS. Although MMS has the lead responsibility, they are required to consult with BLM on adequacy of environmental protection measures in development plans. BLM is responsible for Endangered Species Act compliance work.

Bureau of Reclamation (BR)

Presently BLM manages livestock grazing on approximately 30,581 acres of land withdrawn by the BR on behalf of the San Carlos Indian Tribe. Prior to any developments in this area, the BR must approve the projects. Close coordination between the two agencies would be necessary if fencing the withdrawn riparian areas is considered.

The BLM is responsible for issuance of use authorizations on land administered by the BR. The BR recommends environmental protection stipulations which the BLM includes when issuing the leases.

Bureau of Indian Affairs (BIA)

On July 18, 1950, a cooperative agreement was signed providing for grazing administration of lands withdrawn for the San Carlos Indian Irrigation Project and power site withdrawals reserved in connection with the project, lying below San Carlos Reservoir.

With regard to rangeland management or other activities occurring in the vicinity of the San Carlos Indian Irrigation Project, the BLM will adhere to understandings and agreements as outlined in the July 18, 1950, cooperative agreement.

Advisory Council on Historic Preservation (ACHP)

On January 14, 1980, the Rangeland Programmatic Memorandum of Agreement (PMOA) between the BLM and ACHP pertaining to the Federal Livestock Grazing and Rangeland Management Program was ratified by the Chairman of the ACHP. The PMOA simplifies procedures to be followed in grazing EISs and subsequent related actions for compliance with Section 106 of the National Historic Preservation Act. The intent of the PMOA is to reduce involvement with the ACHP while requiring close coordination with the State Historic Preservation Officer (SHPO). Generally, the ACHP's comments will be requested only when SHPO and BLM cannot agree.

United States Forest Service (USFS)

The BLM is responsible for issuance of mineral leases on lands administered by the USFS. The USFS recommends environmental protection stipulations which the BLM includes when issuing the leases.

State Programs

Arizona Game and Fish Department (AGFD)

Any action proposed for the Arizona portion of the San Simon Cienega Ranch (located both in New Mexico and Arizona) will require coordination with the AGFD. The BLM in New Mexico is responsible for the planning and management of resources other than lands and minerals for the entire San Simon Cienega. The AGFD is responsible for the wildlife in Arizona. Close coordination between the two agencies is necessary to protect and enhance the wildlife habitat.

Consultation with the AGFD would be necessary to determine if the PA would affect any Arizona state listed threatened or endangered species or their habitat.

State Historic Preservation Officer (SHPO)

The BLM cultural resource management program operates in accordance with 36 CFR, Part 800, which provides specific procedures for consultation between BLM and SHPO. Memorandum of Agreement (MOA) NMSO-168 between the SHPO, ACHP, and the BLM New Mexico State Office became effective October 19, 1982. (Technical Report IV contains the MOA.) This MOA coordinates the provisions of 36 CFR 800 with existing BLM procedures, emphasizing the BLM planning system. The MOA incorporates procedures for exchanging information with SHPO concerning cultural resources on public and private lands. It defines those undertakings and activities requiring or not requiring consultation and establishes reporting standards. (Refer to Appendix H-1 for letters of consultation.)

New Mexico Environmental Improvement Division (EID)

The EID, acting as staff to the New Mexico Water Quality Control Commission, has developed a statewide water quality control management plan in response to Section 208 of the Federal Clean Water Act of 1977 (Public Law 95-217). This plan includes an assessment of non-point sources of sediment and recommends best management practices (BMPs) for controlling sediment from various land uses. BLM will consider the content of the BMPs during development of management systems. The broad objective would be to improve the quality of runoff originating on public land.

State Engineer

The State Engineer is the official responsible for determining water rights in the Resource Area. Stock tanks of less than 10 acre-feet capacity do not require a formal water right; however, a water right is required for livestock wells in a designated ground water basin (e.g., Virden Valley, Gila-San Francisco, San Simon, Animas, Playas Valley, Lordsburg Valley, and Mimbres Valley). Water developments associated with BLM rangeland management would be coordinated with the State Engineer's Office to ensure compliance with applicable state regulations.

New Mexico Department of Game and Fish (NMDGF)

A master Memorandum of Understanding (MOU) between the NMDGF and BLM was signed on October 10, 1978 outlining the responsibilities of each agency in New Mexico. (Technical Report IV contains the MOU.) The major thrust of the agreement is that the NMDGF is responsible for the wildlife and the BLM is responsible for the habitat. Close coordination between the two agencies is necessary to protect and enhance the wildlife habitat within the Resource Area.

Coordination on vegetation treatment projects between NMDGF and BLM are outlined in the NMSO Supplemental Manual 6711--Vegetation Control. The Las Cruces District would furnish the NMDGF plans for any proposed vegetation treatment projects at least 6 months prior to the implementation of the projects. The plans would include the method of treatment, the timeframe of the projects, maps of the areas involved, and acreages.

Consultation with the NMDGF would be necessary to determine if the PA would affect any state listed threatened or endangered species or their habitat.

New Mexico Department of Natural Resources (NMDNR) and New Mexico State Heritage Program (NMSHP)

The Department of Natural Resources has been designated the Governor's contact for EISs (other than grazing). They will be contacted on the Energy Minerals issue of this MFP Amendment/EIS. Coordination and consultation with the NMSHP will be necessary to determine if the construction of the proposed rangeland developments and vegetation treatments would affect any state listed threatened, endangered, or sensitive plant species.

New Mexico State Department of Agriculture (NMSDA)

Coordination between the BLM and NMSDA would be necessary to ensure that New Mexico state laws concerning the use of herbicides were complied with prior to any proposed vegetation treatments. The NMSDA has been designated as the Governor's contact for consultation, coordination, and cooperation activities related to the rangeland management program.

State and Private Lands

State and private lands comprise 4.2 million acres (47 percent) within the Resource Area. Approximately .9 million acres contain

Federal minerals with the surface being owned by state or private interests. Where the subsurface is administered by the BLM and the surface is state or privately-owned, the surface owners would be consulted before any surface disturbance is allowed. In this case, no activity will be allowed without a clearance for threatened or endangered species and archaeology.

The BLM, in consultation with private landowners and state lessees would influence the grazing on unfenced intermingled private and state lands within allotments. The BLM also will consult with the State Land Office, the permittee, and the private landowner when establishing grazing capacity on these intermingled lands.

The BLM issues two types of authorizations for recognizing grazing capacity of privately controlled lands: exchange-of-use agreements and percentage Federal land permits. Exchange-of-use agreements may be issued to applicants owning or controlling non-public lands that are interspersed with and normally grazed in conjunction with public land, not to exceed the grazing capacity of the non-public lands. Percentage Federal land permits are issued and generally restricted to allotments that are used and controlled by one operator. After the grazing capacity of all lands within the allotment is determined, the permittee would be billed only for the grazing capacity of the public land.

Section 8 of the Public Rangelands Improvement Act (43 U.S.C. 1901 et. seq.) requires consultation, cooperation, and coordination by BLM with lessees, permittees, landowners, the district advisory boards, and state agencies (refer to Appendix A for BLM Rangeland Consultation Policy in New Mexico).

IMPACTS

A display of the impacts of the PA and alternatives is shown in Table 1-10. Further discussion of these impacts is located in Chapter 3.

TABLE 1-10

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

ENERGY MINERALS

Resource	Existing	Proposed Action		No Action Alternative		Maximization of Energy Minerals Leasing Alternative		Enhancement of Other Resource Values Alternative	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
PHYSICAL SETTING	stable	NS	NS	NS	NS	NS	NS	NS	NS
VEGETATION									
Ground Cover	NS	NS	NS	NS	NS	NS	NS	NS	NS
Threatened or Endangered (T/E) Plant Species	NS	NS	NS	NS	NS	NS	NS	NS	NS
SOILS									
Sediment Yield	NS	NS	NS	NS	NS	NS	NS	NS	NS
WILDLIFE									
Habitat	NC	NS	NS	NS	NS	SI	SI	SI	SI
Direct Disturbance/Animals	NC	SI	SI	SI	SI	SI	SI	SI	SI
GEOLOGY AND MINERAL RESOURCES	NC	NC	NC	NC	NC	NC	NC	NC	NC
LIVESTOCK GRAZING									
Grazing Use (AUMs)	NS	NS	NS	NS	NS	NS	NS	NS	NS
WATER RESOURCES									
Water Depletion (acre-feet)	6	45	120	45	120	45	120	45	120
Riparian/Floodplain Areas	stable	+	+	NC	NC	-	-	+	+
Water Quality	stable	+	+	NC	NC	-	-	+	+
AIR QUALITY	stable	local dust increase	NS	NC	NS	local dust increase	NS	NS	dust decrease
CULTURAL RESOURCES									
Sites Located (sites per 3 miles seismic line)	512	3,033	6,766	NC	NC	3,033	6,766	3,033	6,766
VISUAL RESOURCES	stable	NS-	NS-	NS-	NS-	NS-	NS-	NS-	NS-
RECREATION	stable	NS	NS	NS	NS	-	-	NS	NS
ACECs (naturalness)	NC	NC	NC	NS	NS	NS	NS	NC	NC
WILDERNESS	stable	NS-	NS-	NS-	NS-	NS-	NS-	NS-	NS-
OTHER LAND USES									
SOCIAL CONDITIONS									
Demography		slow growth rate	NC	NC	NC	NC	NC	NC	NC
Social Well Being		stable	NC	NC	NC	NC	NC	NC	NC
Lifestyles/Values		stable	NC	NC	NC	NC	NC	NC	NC
Attitudes, Concerns, Issues		mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed
ECONOMIC CONDITIONS (dollars)									
Annual Geophysical Exploration									
Regional Income	274,165,144	283,433,180	294,840,012	274,165,144	274,165,144	283,433,180	294,840,012	283,433,180	294,840,012
Change	0	9,268,036	20,674,868	0	0	9,268,036	20,674,868	9,268,036	20,674,868
Regional Employment	30,567	31,346	32,305	30,567	30,567	31,346	32,305	31,346	32,305
Change	0	779	1,738	0	0	779	1,738	779	1,738
Annual Geothermal Exploration									
Regional Income	274,165,144	274,337,584	276,333,812	274,165,144	274,165,144	274,337,584	276,333,812	274,337,584	276,333,812
Change	0	172,440	2,168,668	0	0	172,440	2,168,668	172,440	2,168,668
Regional Employment	30,567	30,578	30,720	30,567	30,567	30,578	30,720	30,578	30,720
Change	0	11	153	0	0	11	153	11	153

TABLE 1-10 (continued)

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

ENERGY MINERALS (continued)

Resource	Existing	Proposed Action Short-Term	Proposed Action Long-Term	No Action Alternative Short-Term	No Action Alternative Long-Term	Maximization of Energy Minerals Leasing Alternative Short-Term	Maximization of Energy Minerals Leasing Alternative Long-Term	Enhancement of Other Resource Values Alternative Short-Term	Enhancement of Other Resource Values Alternative Long-Term
ECONOMIC CONDITIONS (continued)									
One Producing Oil and Gas Well[h/]									
Regional Income	274,165,144	274,165,144	291,994,732	274,165,144	274,165,144	274,165,144	291,994,732	274,165,144	291,994,732
Change	0	0	17,829,588	0	0	0	17,829,588	0	17,829,588
Regional Employment	30,567	30,567	32,065	30,567	30,567	30,567	32,065	30,567	32,065
Change	0	0	1,498	0	0	0	1,498	0	1,498
Geophysical and Geothermal Exploration and One Producing Oil and Gas Well[h/]									
Regional Income	274,165,144	283,605,640	314,850,636	274,165,144	274,165,144	283,605,640	314,850,636	283,605,640	314,850,636
Change	0	9,440,496	40,685,492	0	0	9,440,496	40,685,492	9,440,496	40,685,492
Regional Employment	30,567	31,358	33,958	30,567	30,567	31,358	33,958	31,358	33,958
Change	0	791	3,391	0	0	791	3,391	791	3,391

RANGELAND MANAGEMENT

Resource	Existing	Proposed Action Short-Term	Proposed Action Long-Term	No Action Alternative Short-Term	No Action Alternative Long-Term	Maximization of Livestock Forage Production Alternative Short-Term	Maximization of Livestock Forage Production Alternative Long-Term	Enhancement of Other Resource Values Alternative Short-Term	Enhancement of Other Resource Values Alternative Long-Term	Elimination of Livestock Grazing Alternative Short-Term	Elimination of Livestock Grazing Alternative Long-Term
GRAZING USE (AUMs)	227,031[a/]	213,286[b/]	257,402	264,244[c/]	264,244[c/]	213,286[b/]	297,765	155,319[b/]	228,530	0	0
PHYSICAL SETTING	stable	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
VEGETATION											
Ecological Condition (acres)											
Excellent	1,893	NS	18,822	NS	0	NS	18,822	NS	27,518	NS	36,213
Good	91,082	NS	197,712	NS	74,371	NS	350,939	NS	318,457	NS	439,201
Fair	825,651	NS	929,142	NS	672,212	NS	811,971	NS	867,112	NS	805,085
Poor	512,876	NS	285,824	NS	684,917	NS	249,768	NS	218,413	NS	151,001
Forage Value (acres)											
Good	223,460	NS	347,019	NS	214,186	NS	474,015	NS	474,433	NS	585,439
Fair	512,381	NS	581,155	NS	346,346	NS	490,215	NS	494,107	NS	415,749
Poor	695,661	NS	503,328	NS	870,970	NS	467,272	NS	462,962	NS	430,314
Ground Cover (percent)	14	NS	16	NS	15	NS	16	NS	17	NS	18
Threatened or Endangered (T/E) Plant Species	NC	NS	NS	NC	NC	- d/	- d/	+	+	+	+
SOILS											
Sediment Yield (acre ft/sq mi/yr)	NC	NC	NS	NC	NC	NS	NS	NS	NS	NS	NS
WILDLIFE											
AUMs Allocated[f/]	2,154	1,917	3,497	2,154	2,154	1,917	3,512	1,917	3,497	e/	e/
Deer Population	1,226	1,226	2,515	1,226	1,226	1,226	2,515	1,226	2,515		
Bighorn Sheep Population	55	55	471	55	471	55	471	55	471		
Pronghorn Population	10	10	30	10	10	10	42	10	30		
Javelina Population	g/	NC	NS	NC	I	D	D	NC	D	I	I
Estimated Overall Change in Standard Habitat Sites	NC	I	I	D	D	I	I	I	I	I	I
T/E Animal Species											
Riparian Associated	NC	+	+	-	-	+	+	+	+	+	+
GEOLOGY AND MINERAL RESOURCES	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
LIVESTOCK GRAZING											
Numbers of Operators	262	262	262	262	262	262	262	260	260	0	0

TABLE 1-10 (continued)

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

RANGELAND MANAGEMENT (continued)

Resource	Existing	Proposed Action		No Action Alternative		Maximization of Livestock Forage Production Alternative		Enhancement of Other Resource Values Alternative		Elimination of Livestock Grazing Alternative	
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term
WATER RESOURCES											
Water Depletion (acre-feet)											
Livestock and Wildlife	278	261	316	NC	NC	261	365	191	281	1	3
Stockpond Evaporation	825	825	894	NC	NC	825	960	825	894	NC	NC
Surface Runoff											
Acres Decrease 0-9%	NC	0	633,005	NC	NC	0	0	0	681,176	0	709,609
Acres Decrease 10-20%	NC	0	42,279	NC	NC	0	468,046	0	42,279	0	0
Acres Increase 0-9%	NC	42,279	0	NC	NC	462,816	0	42,279	0	0	0
Riparian/Floodplain Areas	stable	NC	NC	NC	NC	NC	NC	+	+	+	+
Water Quality	stable	+	+	NC	NC	-	-	+	+	+	+
AIR QUALITY	stable	local dust increase	NS	NS	NS	local dust increase	NS	NS	dust decrease	dust decrease	dust decrease
CULTURAL RESOURCES											
Sites Located Near Rangeland Developments	NC	120[i]	0	NC	NC	496	0	121	0	0	0
VISUAL RESOURCES	stable	NS-	NS	NC	NC	NS-	NS-	NS-	NS	NS+	NS+
RECREATION	stable	NS	NS	NC	NC	-	NS-	NS	NS	NS	NS
Deer Hunting Visitor Hours	79,560	79,560	137,565	79,560	79,560	79,560	137,565	79,560	137,565	79,560	153,315
ACECs (naturalness)	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
WILDERNESS	stable	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS+
OTHER LAND USES											
SOCIAL CONDITIONS											
Demography		slow growth rate	NC	NC	NC	NC	NC	NC	NC	NC	NC
Social Well Being		stable	NC	NC	NC	NC	NC	NC	NC	NC	SI
Lifestyles/Values		stable	NC	NC	NC	NC	NC	NC	NC	SI	SI
Attitudes, Concerns, Issues		mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed	mixed
ECONOMIC CONDITIONS (dollars)											
Total Receipts	7,813,071	7,402,371	8,318,530	7,813,071	7,813,071	7,402,371	9,320,464	6,264,020	7,775,458	3,454,055	3,454,055
Change	0	-410,700	505,459	0	0	-410,700	1,507,393	-1,549,051	37,613	-4,359,016	-4,359,016
Variable Costs	3,165,751	3,001,637	3,377,283	3,165,751	3,165,751	3,001,637	3,783,678	2,509,777	3,150,321	1,373,196	1,373,196
Change	0	-164,114	211,532	0	0	-164,114	617,927	-655,974	-15,430	-1,792,555	-1,792,555
Returns Above Variable Costs	4,647,320	4,400,734	4,941,247	4,647,320	4,647,320	4,400,734	5,536,786	3,754,243	4,625,137	2,080,859	2,080,859
Change	0	-246,586	293,927	0	0	-246,586	889,466	-893,077	-22,183	-2,566,461	-2,566,461
Fixed Costs[i]	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918	417,918
Depreciation[i]	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588	1,270,588
Returns to Operator, Labor, Management, Capital	2,958,814	2,712,228	3,252,741	2,958,814	2,958,814	2,712,228	3,848,280	2,065,737	2,936,631	392,353	392,353
Change	0	-246,586	293,927	0	0	-246,586	889,466	-893,077	-22,183	-2,566,461	-2,566,461
Regional Income	274,165,144	273,968,356	274,403,712	274,165,144	274,165,144	273,968,356	274,879,824	273,427,420	274,145,660	272,092,152	272,092,152
Change	0	-196,788	238,568	0	0	-196,788	714,680	-737,724	-19,484	-2,072,992	-2,072,992
Regional Employment	30,567	30,535	30,605	30,567	30,567	30,535	30,682	30,448	30,563	30,233	30,233
Change	0	-32	38	0	0	-32	115	-119	-4	-334	-334

TABLE 1-10 (continued)

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

PROPOSED SPECIAL DESIGNATION AREAS

Resource	Existing (No Designation)	Proposed Action (Designate ACEC)
Gila Lower Box Riparian		
VEGTATION		
Ecological Condition (acres)	NC	+
Forage Value (acres)	NC	+
Ground Cover	NC	+
Threatened or Endangered (T/E) Plant Species	NC	+
WILDLIFE		
Riparian Standard Habitat Site	D	I
Fisheries Habitat	D	I
T/E Species	-	+
GEOLOGY AND MINERAL RESOURCES	NC	NC
LIVESTOCK GRAZING	NC	-
WATER RESOURCES		
Riparian/Floodplain Areas	-	+
Water Quality	-	+
CULTURAL RESOURCES	NC	+
VISUAL RESOURCES	stable	+NC
RECREATION	stable	+
WILDERNESS	stable	+
Gila Middle Box Wildlife		
VEGTATION		
Ecological Condition (acres)	NC	NC
Forage Value (acres)	NC	NC
Ground Cover	NC	NC
Threatened or Endangered (T/E) Plant Species	NC	NC
WILDLIFE		
Riparian Standard Habitat Site	D	I
Fisheries Habitat	D	I
T/E Species	-	+
GEOLOGY AND MINERAL RESOURCES	NC	NC
LIVESTOCK GRAZING	NC	NC
WATER RESOURCES		
Water Quality	NC	+
CULTURAL RESOURCES	NC	NC
VISUAL RESOURCES	stable	NC
RECREATION	stable	+
Organ Mountains Scenic		
VEGTATION		
Ecological Condition (acres)	NC	+
Forage Value (acres)	NC	+
Ground Cover	NC	+
Threatened or Endangered (T/E) Plant Species	NC	+

TABLE 1-10 (concluded)

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

PROPOSED SPECIAL DESIGNATION AREAS (continued)

Resource	Existing (No Designation)	Proposed Action (Designate ACEC)
Organ Mountains Scenic (continued)		
WILDLIFE		
Big Game Habitat	NC	+
GEOLOGY AND MINERAL RESOURCES		
Locatable	NC	-
Leasable	NC	NS
Saleable	NC	NS
LIVESTOCK GRAZING	NC	NC
VISUAL RESOURCES	stable	+
RECREATION	stable	+
WILDERNESS	stable	+

Source: BLM Las Cruces District Las Cruces District Office Files, 1980.

Notes:
a/Preference is 264,244 AUMs but 5-year average licensed use is 227,031.
b/Worst case basis.
c/Shows present preference, but actual use would probably average the same as the 5-year average of 227,031.
d/Mechanical treatment, seedling, and chemical treatment only; other values same as PA.
e/All AUMs available to wildlife.
f/Populations for areas with more than .5 animals per section (Map 2-2).
g/No numbers calculated; population trend given.
h/The producing oil well is assumed to occur in the long-term for each alternative.
i/Cultural resource numbers refer to number of sites; to get acres, multiply by 32.
j/Fixed costs and depreciation are assumed to remain constant.
NC: No change from existing (changes not quantifiable).
NS: Not significant.
SI: Significant impact.
+ : Beneficial.
- : Adverse.
I : Increased value.
D : Decreased value.
0 : Zero.

CHAPTER 2

AFFECTED ENVIRONMENT

CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the environmental components of the Las Cruces/Lordsburg Resource Area (LCLRA) that would be affected by implementation of the Proposed Action or the alternative(s). Components include: physical setting, vegetation, soils, wildlife, geology and mineral resources, livestock grazing, water resources, air quality, cultural resources, visual resources, recreation, areas of critical environmental concern, wilderness, other land uses, and social and economic conditions.

Each component of this chapter describes the affected environment of the entire Resource Area, unless stated otherwise. Any component describing an area other than the Resource Area will refer to the counties involved and where the information not covered can be found.

PHYSICAL SETTING

Climate

The LCLRA is characterized by an arid to semiarid continental climate, with mild winters and pleasant to extremely hot summers. Average annual precipitation in the area ranges from 8 to 10 inches at elevations below 6,000 feet, and from 14 to 16 inches at higher elevations. A wide variation in annual totals is characteristic of arid climates as illustrated by annual extremes of 18.8 and 4.4 inches at Lordsburg during a 56 year period of record. More than half the yearly precipitation falls during July, August, and September when moist air masses move into the area from the Gulf of Mexico. Rainfall during this period is from convective thundershowers that are commonly intense and of short duration. Fall, winter, and spring are relatively dry seasons, influenced primarily by air masses moving across the area from the Pacific Ocean. Table 2-1 shows average monthly and annual precipitation for selected weather stations within the Resource Area. General locations of weather stations are contained in Technical Report V.

The average annual temperature of the Resource Area is around 60°F. During the summer months, daytime temperatures quite often exceed 100°F. The average maximum temperature during July, the warmest month, is near 95°F. In January, the coldest month, average monthly minimum temperature is in the middle 20's. Throughout the year, daily high to low ranges of 30° or more are common, as is characteristic of southern desert climates.

Wind speeds average around 6 miles per hour (mph) throughout the Resource Area. During the summer months, the prevailing wind direction is from the southeast. Brief, strong winds often accompany convectional

TABLE 2-1

AVERAGE MONTHLY AND ANNUAL PRECIPITATION

Station	Altitude	Average Monthly 1970-1980												Average Annual 1970-1980	Normal 1941-1970
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Animas	4,415	.56	.64	.46	.16	.20	.27	1.74	2.45	1.45	1.40	.44	.65	10.53	10.35
Columbus	4,010	.48	.50	.13	.17	.21	.25	2.30	1.44	1.59	1.12	.51	.49	9.12	8.82
Deming	4,332	.69	.50	.29	.11	.18	.26	1.68	1.92	1.33	1.30	.37	.71	9.48	8.56
Florida	4,450	.59	.58	.20	.08	.27	.54	2.00	1.92	1.83	1.08	.44	.55	10.09	9.58
Gage[a/]	4,410	.76	.51	.35	.08	.22	.52	2.73	1.42	1.23	1.66	.39	.64	10.15	b/
Hachita	4,495	.66	.53	.37	.16	.21	.30	2.08	2.15	1.48	1.23	.39	.58	10.14	9.43
Lordsburg	4,250	.84	.58	.64	.18	.36	.37	1.64	1.56	1.36	1.35	.35	.81	10.04	10.32
Redrock	4,150	.98	.87	.70	.13	.30	.50	2.30	2.41	2.18	1.47	.56	.67	12.88	b/
White Signal	6,070	1.39	1.06	.63	.21	.42	.44	2.43	2.09	1.93	.80	.56	.87	13.59	b/
New Mexico State University	3,881	.49	.36	.19	.18	.31	.52	1.55	2.57	1.51	1.05	.47	.45	9.21	7.89

Source: National Oceanic and Atmospheric Administration (NOAA) 1970-1980.

Notes: a/Partial record.

b/Normal 1941-1970 record is not available.

thunderstorms during the summer months. In the winter, the prevailing wind direction is mostly from the north as Arctic air enters the area from the Pacific Northwest. The spring months (March-May) are commonly referred to as the windy season when dry, gusty winds predominate from the west in excess of 30 mph. The gusty winds coupled with dry soils occasionally cause severe afternoon dust storms.

Topography

The LCLRA lies within the Basin and Range Physiographic Province. Typical landforms include rugged and steep fault block mountain ranges, broad basins, and gentle volcanic landforms. Dominant topographic features include: the Organ Mountains, Florida Mountains, Big and Little Hatchet Mountains, Animas Mountains, Peloncillo Mountains, Burro Mountains, and Cooke's Range. In contrast to these ranges are several broad valleys including Animas Valley, Playas Valley, Hachita Valley, Mesilla Bolson, and Rio Grande/Mesilla Valley.

Elevations in the LCLRA range from a low of approximately 3,800 feet above mean sea level in the southern Mesilla Valley to a high of 9,012 feet above mean sea level at Organ Needle. Average elevation in the is approximately 5,000 feet.

VEGETATION

A soil-vegetation inventory was conducted on 1,636,403 acres of public land in Grant, Hidalgo, Luna, and part of Cochise Counties in 1981. Range sites were delineated based on soil characteristics and landform. Vegetation was identified on each range site.

Vegetative transects were run on all allotments within the grazing district boundary. Most of the allotments outside this boundary were not transected. These public land acres by range site are listed as unclassified in Table 2-2. Transect data consisted of vegetation production by plant species, percent composition, and ground cover. Ground cover included vegetative species, litter, bare ground, and large and small rocks.

Data gathered during this inventory provided pounds of vegetation produced during the 1981 growing season on various range sites. This inventory also provided information for determining ecological condition and forage value class ratings. The methodologies used in the range inventory are explained in Appendix B-2 to B-6. Visuals showing locations of range sites and vegetative subtypes are available for review in the Las Cruces District Office. Major plant species identified on the vegetative transects in the 3-County Area are listed in Appendix B-7.

Grant, Hidalgo, Luna, and a small part of Cochise Counties fall within two major land resource areas (MLRAs) as described by the U.S. Department of Agriculture (USDA), Soil Conservation Service (1982). The two MLRAs are Southern Desert-Subresource Area-SD-2 (MLRA 42) and Western Plateau-Subresource Area-WP-3 (MLRA 36).

TABLE 2-2

PUBLIC LAND ACRES AND PERCENTAGES FOR ECOLOGICAL CONDITION AND FORAGE VALUE CLASS BY RANGE SITE a/

	Ecological Condition										Forage Condition					
Range Site	Excellent	Percent	Good	Percent	Fair	Percent	Poor	Percent	Unclassified	Percent	Good	Percent	Fair	Percent	Poor	Percent
Southern Desert MLRA 42																
Gravelly			2,278	0	448,655	27	72,235	5	15,336	1	14,189	1	114,434	7	394,545	24
Deep Sand							8,613	1	2,117	0			2,725	0	5,888	0
Sandy					20,752	1	98,776	6	16,733	1	10,053	1	22,223	1	87,252	5
Loamy					59,743	4	56,266	4	28,117	2	19,123	1	42,893	3	53,993	3
Draw	1,893	0	39,755	3	8,383	1	4,194	0	1,621	0	3,428	0	43,378	3	7,419	1
Bottomland			1,678	0	1,498	0	5,097	0	1,067	0	874	0	6,747	0	652	0
Limy							5,225	0					260	0	4,965	0
Limestone Hills					888	0	7,214	0			1,611	0	2,992	0	3,499	0
Clayey			16,540	1	35,077	2	16,023	1	11,826	1			32,957	2	34,683	2
Gravelly Sand					466	0	3,054	0	23	0	523	0	1,100	0	1,897	0
Igneous Hills			26,184	2	198,775	12	123,606	8	41,741	3	143,929	9	159,716	10	44,920	3
Salty Bottomland			897	0	138	0			297	0			1,035	0		
Gravelly Loam					14,960	1	18,732	1	14,479	1	9,873	1	16,480	1	7,339	1
Salt Flats			1,816	0	13,507	1	38,932	2	6,933	1	8,153	1	16,557	1	29,545	2
Malpais					1,201	0	16,981	1	420	0			10,570	1	7,612	0
Subtotal	1,893	0	89,148	6	804,043	49	474,948	29	140,710	10	211,756	14	474,067	29	684,209	41
Western Plateau MLRA																
Shallow									84	0						
Gravelly							640	0					640	0		
Hills					13,540	1	14,286	1	57,006	3	2,318	0	16,201	1	9,307	1
Loamy					5,100	0	536	0	4,158	0	5,100	0			536	0
Breaks			1,934	0	1,964	0	21,856	1	2,679	0	3,282	0	21,473	1	999	0
Bottomland							610	0	159	0					610	0
Clayey									105	0						
Malpais					1,004	0					1,004	0				
Subtotal			1,934	0	21,608	1	37,928	2	64,191	3	11,704	0	38,314	2	11,452	1
TOTAL	1,893	0	91,082	6	825,651	50	512,876	31	204,901	13	223,460	14	512,381	31	695,661	42

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Note: a/Total acres for the 3-County Area are 1,636,403.

The Southern Desert MLRA is characterized by elevations of 3,800 to 5,000 feet with mountain areas up to 8,000 feet. Gently sloping plains are broken by abrupt rising desert mountains. Climate in this warm, arid region is characterized mostly by summer precipitation with an annual rainfall of 8 to 10 inches. Average annual temperature is 60°F with extremes of 5° below zero in the winter and 110°F in the summer. Potential natural vegetation on these soils will support grassland (short, mid, and tall grass) and mixed grass-shrubland vegetation. In the 3-County Area, 92 percent or 1,510,742 public land acres are in this MLRA.

The Western Plateau MLRA, characterized by elevations of 5,000 to 6,500 feet, is associated with general foothill topography with numerous canyons and dry washes adjacent to mountains. Annual precipitation is 12 to 16 inches. Average annual temperature is 56°F with extremes of 12° below zero in the winter to 103°F in the summer. Potential natural vegetation on these soils will support grassland vegetation. In the 3-County Area, 8 percent or 125,661 public land acres are in this MLRA.

An analysis of the inventory data dealing with range sites, associated vegetative subtypes, and ecological condition classes is presented in Appendix B-8. Averages are given for pounds of vegetative production per acre (1981 growing season), and percent vegetative cover, litter, and bare ground based on the given number of transects. Percent composition by weight of grasses and shrubs is shown relative to the desirabilities of plant species preferred by grazing animals. The three categories are desirable, intermediate, and least desirable, based on palatability and preference.

Total pounds of vegetative production per acre during the 1981 growing season varied from 21 to 3,580 pounds in the Southern Desert MLRA. The Western Plateau MLRA varied from 100 to 2,845 pounds per acre. This variation existed on all vegetative subtypes within range sites. The high, low, and weighted average vegetative production for each range site is presented in Table 2-3. The variation in pounds per acre is greater in the Southern Desert MLRA than the Western Plateau MLRA due to more intensive sampling in this larger area.

The ecological condition class ratings are based on the Soil Conservation Service's potential plant community for a particular range site as compared to the existing species composition. The description of the potential plant communities on all range sites are available in Technical Guides from the USDA, Soil Conservation Service (1980).

Forage value class ratings are based entirely on the existing vegetation situation. The presence or absence of a certain species can make this rating higher, equal to, or lower than the ecological condition. The methodology for determining the forage value class rating is shown in Appendix B-3.

Apparent trend information was collected by site write-up area (SWA) for all allotments within the grazing district boundary in the 3-County Area. The apparent trend information is based on one growing

TABLE 2-3

AVERAGE VEGETATIVE PRODUCTION BY RANGE SITE[a]

	Pounds of Production per Acre			SCS Potential Average Pounds of Production per Acre[b] Years	
Range Site	High Average	Low Average	Weighted Average	Favorable	Unfavorable
Southern Desert MLRA 42					
Gravelly	276	74	168	450	150
Deep sand	286	87	229	600	175
Sandy	677	47	269	650	225
Loamy	539	97	243	675	300
Draw	1,186	64	514	2,000	600
Bottomland	3,442	30	1,168	3,500	1,800
Limy	1,322	84	343	575	200
Limestone hills	367	141	244	750	325
Clayey	612	82	323	600	200
Gravelly sand	1,089	434	768	425	125
Igneous hills	3,580	59	481	750	325
Salty bottomland	3,262	119	906	3,000	1,000
Gravelly loam	1,204	81	324	675	275
Salt flats	408	21	203	1,500	400
Malpais	677	76	260	750	300
Western Plateau MLRA 36					
Shallow	c/	c/	c/	1,200	475
Gravelly	202	202	202	1,300	550
Hills	639	262	540	1,300	575
Loamy	491	265	434	1,000	425
Breaks	529	157	284	1,100	375
Bottomland	2,845	100	1,958	4,000	1,750
Clayey	c/	c/	c/	875	300
Malpais	725	725	725	1,100	425

Sources: BLM Las Cruces District Inventory Data, 1981-1982; USDA, Soil Conservation Service, 1980.

Notes: a/Information obtained from data in Appendix B-8.

b/USDA, SCS potential average pounds of production per acre figures for favorable and unfavorable years are presented for comparison purposes only.

c/These mapped range sites were not transected.

season and is summarized for vegetative subtypes by range sites in Appendix B-8. Apparent trend information shows approximately 86 percent of the area is in static condition with 5 percent improving and 9 percent in a downward trend. The methodology used for determining apparent trend is shown in Appendix B-5. Trend studies on allotments with Allotment Management Plans (AMPs) have been conducted for approximately 10 years. The data from these studies show rainfall as the overriding influence in these study areas and that upward and downward trends occur during periods of favorable and unfavorable climatic conditions.

Public land acres and percentages for each ecological condition and forage value class by range site are presented in Table 2-2. Information pertaining to individual grazing allotments (acres, land status, range sites, vegetative subtypes, and condition) is available for review in the Las Cruces District Office.

Vegetation Subtypes and Range Site Descriptions

Soil-vegetation inventory data gathered during the 1981 inventory show 31 vegetative subtypes covering 23 range sites in the 3-Counties. Seven major range sites cover 88 percent or 1,464,683 acres of the 3-County Area. Seven major vegetative subtypes cover 1,428,056 acres or 88 percent of the same area.

The Southern Desert MLRA covers 15 different range sites with 30 vegetative subtypes present. Six major range sites (gravelly, igneous hills, loamy, sandy, clayey, and salt flats) occur in this MLRA, covering 1,349,851 acres. All seven major vegetative subtypes (creosote, midgrasses, snakeweed, mixed desert shrub, mesquite, mixed mountain shrub, and tarbush) are present.

The Western Plateau MLRA covers eight different range sites with 15 vegetative subtypes present. One major range site (hills) occurs in this MLRA, covering 84,832 acres. Six major vegetative subtypes (minus tarbush) are present.

Acres of public land and percent for each vegetative subtype are presented in Table 2-4. Acres for each range site with associated major vegetative subtypes and percentages are presented in Table 2-5. A total vegetative subtype acreage classification for each range site is contained in Appendix B-9. Range site descriptions are available in the Technical Guides from USDA, Soil Conservation Service (1980).

Major Range Sites--Southern Desert MLRA and Associated Vegetative Subtypes

Gravelly range sites cover 538,504 acres or 33 percent of the public land in the 3-County Area. Gravelly areas occur along the footslopes of desert mountains and side slopes of arroyos and water courses. The landscape is characterized by low hills, ridges, fans, and footslopes with 5 to 30 percent slope. Creosote is the dominant vegetation on 445,838 acres or 83 percent of the gravelly range site. Creosote occurs on ten other range sites and covers an additional 50,133

TABLE 2-4

ACRES AND PERCENT OF PUBLIC LAND BY VEGETATIVE SUBTYPE

Vegetative Subtype	MLRA 42 (acres)	Percent	MLRA 36 (acres)	Percent
Filaree	711	0		
Annual forbs	22	0	483	0
Short grass	213	0		
Midgrass	385,698	24	35,790	2
Tall grass	12,506	1		
Creosote	495,971	30	15,489	1
Tarbush	66,254	4		
Broom dalea	534	0		
Mesquite	104,362	6	146	0
Fourwing saltbush	6,430	0		
Other saltbushes	7,717	1		
Mixed desert shrub	108,650	7	8,138	1
Oakbrush	3,402	0	4,254	0
Mixed mountain shrub	75,937	5	26,859	2
Cacti	367	0		
Yucca	3,304	0	571	0
Whitethorn or catclaw acacia	445	0		
Mariola	2,543	0		
Snakeweed	191,184	12	4,173	0
Fringed sagebrush	21	0		
Mormon tea	1,032	0		
Ocotillo	3,969	0		
Sacahuista	7,383	0	1,143	0
Other shrubs	10,443	1	926	0
Desert willow	1,185	0		
Cottonwood	434	0		
Other broadleaf trees	3,044	0	757	0
Ponderosa pine			1,883	0
Pinyon-juniper	313	0	7,227	1
Pinyon	1,226	0		
Juniper	2,943	0	17,631	1
Playas	12,499	1		0
Quarries			117	0
Other barren			74	0
Subtotal	1,510,742	92	125,661	8
TOTAL ACRES 3-COUNTY AREA	1,636,403			

Source: BLM Las Cruces District Inventory Data, 1981-1982.

TABLE 2-5

SUMMARY OF PUBLIC LAND ACRES AND PERCENT BY RANGE SITES AND MAJOR VEGETATIVE SUBTYPES a/

Range Site	Acres	%	Creosote	%	Midgrass	%	Snakeweed	%	Mesquite	%	Mixed Desert Shrub	%	Mixed Mountain Shrub	%	Tarbush	%	Other Important Subtypes	%
Southern Desert MLRA 42																		
Gravelly	538,504	33	445,838	83											38,029	7		
Deep Sand	10,730	1	866	8					8,406	78								
Sandy	136,261	8					59,620	44	48,028	35	12,111	9			13,554	9		
Loamy	144,126	9			45,507	32	50,685	35	14,586	10								
Draw	55,846	3			50,571	91												
Bottomland	9,340	1			5,272	57					2,013	22					1,086	12 (other broadleaf trees)
Limy	5,225	0	2,461	47			1,041	20							1,217	23		
Limestone Hills	8,102	0									4,783	59					2,691	33 (ocotillo)
Clayey	79,466	5			54,689	69	8,370	11							11,537	15		
Gravelly Sand	3,543	0															2,062 1,412	58 (other shrubs) 40 (other broadleaf trees)
Igneous Hills	390,306	24			189,456	49	37,471	10			48,916	13	73,032	19				
Salty Bottomland	1,332	0			520	39					674	51						
Gravelly Loam	48,171	3			15,945	33	9,620	20	12,285	26	8,593	18						
Salt Flats	61,188	4			11,805	19			10,557	17							7,685 6,430 12,499	11 (other saltbushes) 13 (fourwing saltbush) 20 (playas)
Malpais	18,602	1	6,328	34	8,191	44							2,790	15				
Subtotal	1,510,742	92																
Western Plateau MLRA 36																		
Shallow	84	0			84	100												
Gravelly	640	0															640	100 (other shrubs)
Hills	84,832	5			25,249	30							26,217	31			7,227 15,923	9 (pinyon-juniper) 19 (juniper)
Loamy	9,794	1			8,635	88												
Breaks	28,433	2	14,953	53			2,507	9			7,278	26						
Bottomland	769	0															286 133 350	37 (other shrubs) 17 (other annual forbs) 46 (other broadleaf trees)
Clayey	105	0			105	100												
Malpais	1,004	0			1,004	100												
Subtotal	125,661	8																
TOTAL ACRES BY 3-COUNTY AREA	1,636,403																	

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Notes: a/From data in Appendix B-9.

acres. Small amounts of midgrasses (grama grasses and tobosa) also occur on gravelly sites.

The igneous hills range site covers 390,306 acres or 24 percent of the public land in the 3-County Area. This range site is characterized by rolling to steep hills and mountain footslopes. Slopes average from 15 to 50 percent while direction of slope is variable. Midgrass and mixed mountain shrub are the dominant vegetative subtypes on these areas. Midgrasses, covering 49 percent or 189,456 acres of the hills, are the most productive subtype. Midgrasses occur on 12 other range sites and cover an additional 196,242 acres. Major midgrass species include gramas, muhlys, and in smaller amounts, threeawns, tobosa, panicums, bluestems, and lovegrasses. These midgrass associations also occur on gravelly loams and the malpais range sites. Mixed mountains shrubs (including oak brush, mountain mahogany, juniper, sumac, and small amounts of other species) cover 19 percent or 73,032 acres of this range site.

Loamy range sites cover 144,126 acres or 9 percent of the public land in the 3-County Area. These areas are found on piedmont slopes. Slopes range from 1 to 15 percent, but are usually less than 10 percent. Snakeweed and midgrass are the dominant vegetative subtypes on this range site. Snakeweed, a short-lived perennial, occurs on 35 percent or 50,685 acres of this range site. Snakeweed occurs on nine other range sites and covers an additional 140,499 acres. Midgrass species (gramas, muhlys, tobosa, and threeawns) occur in the same associations as found in the hills range site. Midgrasses cover 45,507 acres or 32 percent of this range site.

Sandy range sites occur on 136,261 acres or 8 percent of the public land in the 3-County Area. These sites usually occur on level to gently sloping or undulative piedmont slopes or plains. Slopes range from 1 to 15 percent, averaging less than 10 percent. Snakeweed and mesquite are the dominant vegetative subtypes on these areas. Snakeweed covers 59,620 acres or 44 percent of this range site. Mesquite is the co-dominant on this range site. Mesquite is usually in the sand dunes with snakeweed occurring in the interdune areas. This mesquite-snakeweed association also occurs on the deep sand range site. Mesquite occurs on 48,028 acres or 35 percent of this range site. Mesquite occurs on 11 other range sites and an additional 56,334 acres. Small amounts of midgrasses (dropseeds and tobosa) occur in association with mesquite and snakeweed.

Clayey range sites cover 79,466 acres or 5 percent of the public land in the 3-County Area. Clayey sites occur on piedmont slopes or permanently drained floodplains averaging less than 5 percent. Midgrass and tarbush are the dominant vegetative subtypes. Midgrasses, mainly tobosa and burro grass, cover 54,689 acres or 69 percent of this range site. Tarbush, an invader species, occurs on 11,537 acres or 15 percent of the clayey range site. Tarbush occurs on six other range sites and covers an additional 54,717 acres.

The salt flat range site occurs on level to gently sloping, broad alluvial flats of less than 3 percent slope. These areas cover

61,188 acres or 4 percent of the public land in the 3-County Area. Midgrasses, mesquite, and other saltbushes (excluding fourwing saltbush) are the dominant vegetative subtypes on these areas. Midgrasses (tobosa and alkali sacaton) cover 11,805 acres or 19 percent of this range site. Mesquite covers 10,557 acres or 17 percent of these areas. Other saltbush species occur on 13 percent or 7,685 acres. Playas, with less than 2 percent vegetation, cover 20 percent or 12,499 acres.

Bottomland range sites, although not a major part of the 3-County Area (9,340 acres of public land or 1 percent), are important, highly productive areas. This range site occurs on main floodplains and is subject to overflow or flooding. Water may stand for several hours or days and slopes are less than 3 percent. Midgrasses, mixed desert shrubs, and other broadleaf trees are the dominant vegetative subtypes. Midgrasses (tobosa, dropseeds, and bermuda grass) occur on 57 percent or 5,272 acres. Mixed desert shrubs (mesquite, four-wing saltbush, and snakeweed) cover 2,013 acres or 22 percent of this area. Mixed desert shrub associations (including several other shrub species) cover an additional 114,775 acres and 14 other range sites. Bottomland areas, especially in the Gila River, Guadalupe Canyon, and the San Simon Cienega have concentrations of broadleaf deciduous trees such as cottonwoods, sycamores, walnuts, and willows with many other grass and shrub species present. These areas cover 12 percent or 1,086 acres of this range site. Other broadleaf tree subtypes cover an additional 2,715 acres and five other range sites.

Percentages of ground cover, vegetation production, and ecological condition vary on each range site depending on other associated species.

Major Range Sites--Western Plateau MLRA and Associated Vegetative Subtypes

The hills range site covers 84,832 acres or 5 percent of the public land in the 3-County Area. This site is characterized by rolling to steep hills and mountain footslopes with a 15 to 75 percent slope. Exposure or direction of slopes are variable. Mixed mountain shrubs and midgrasses are the dominant vegetation. Mixed mountain shrubs, including pinyon, juniper, sumacs, oak, and mountain mahogany, occur on 26,271 acres or 31 percent of this range site. Midgrasses cover 25,249 acres or 30 percent of these areas. Due to higher elevations, more cool season perennial species are present such as bromes, fescues, lovegrasses, muhlys, curly mesquite, and ricegrass.

Percentages of ground cover, vegetation production, and ecological condition vary for each range site depending on other associated species. Vegetation information for Dona Ana County is discussed in the Southern Rio Grande Grazing EIS (1981).

Forage Species

The phenology of the more important forage species for livestock (grasses) and wildlife (shrubs) is contained in Technical Report VI. These species occur predominantly in the Southern Desert MLRA which covers 92 percent or 1,510,742 acres of the public land in the 3-County Area. The forage species are comprised primarily of warm-season perennial grasses and a few cool-season shrubs. Cool-season perennial grass species which are important in the Western Plateau MLRA are not discussed in Technical Report VI. This MLRA covers 8 percent of the public land in the 3-County Area with midgrasses the dominant vegetative subtype on 28 percent or 35,790 acres. Annual grasses and forbs were not listed, however, they are recognized as being vitally important and contribute substantially to the diet of livestock and wildlife on semidesert rangelands.

Studies using esophageal fistulated animals show that cattle diets contain about 30 percent forbs on a yearly basis (Pieper and Beck 1980; Gonzalez-Rodriguez et al. 1978; Rosiere et al. 1975; Galt et al. 1969; Herbel and Nelson 1966). Rosiere et al. (1975) found that although perennial grasses represented a dependable source of forage, they never comprised more than 50 percent of a steer's diet in any season. Rangeland managers need to be more aware of the importance of forbs in livestock diets and that perennial grasses should not be the sole criterion for estimating forage production or determining stocking rates.

Poisonous Plants

In some areas, poisonous plants can cause problems to livestock during certain times of the year. Many poisonous plant species, particularly annual and perennial forbs, grow in disturbed or heavily used areas. The plants, their persistence, animals affected, and toxic season are shown in Appendix B-10.

Threatened, Endangered, or Sensitive Plants

Plant species occurring in the Resource Area which are Federally listed and those selected by the New Mexico State Heritage Program as a special concern element are listed in Appendix B-11. A contract for threatened or endangered plants in the Resource Area was issued October 2, 1981, to Health Research and Analysis, Inc. The final report is scheduled for completion on April 22, 1983.

SOILS

Soil surveys were conducted by the Soil Conservation Service to inventory and collect interpretive data on the soils within the 3-County Area. This data was compiled in soil surveys of Hidalgo County (December 1973), Luna County (May 1980), and Grant County (unpublished, 1979). The soil surveys were of an order three level intensity on public rangelands, whereas higher intensity second-order surveys were conducted on potential agricultural lands such as those identified in the Mimbres, Playas, Animas, San Simon, and Gila Valleys.

The soil surveys depict map units which are made up of one or more soil series (e.g. LN -- Lehmans-Nickel association). Soils within a given soil series have similar diagnostic features and characteristics, therefore, all areas mapped as a given soil series or map unit will express similar soil characteristics. (See Appendix C-1 for series and classification of soils in the Las Cruces/Lordsburg Resource Area.)

Soils with the potential to produce certain native plant communities which have similar range interpretations and erosion class ratings are grouped into range sites. Several soil series can make up a particular range site, but they will all have similar soil characteristics, slope classes, erosion potential, and they generally support a certain vegetative community. Visuals showing the range sites are available for review in the Las Cruces District Office. Physical and chemical parameters of the soil series making up the various range sites are contained in Technical Report VII.

Major soil types by range site as they occur in the Resource Area are as follows:

1. hills -- shallow, stony, and cobbly loams
2. gravelly and gravelly loam -- gravelly or cobbly, calcareous
3. sandy, deep sand -- deep, sandy, calcareous
4. loamy, draw, clayey -- deep, medium to fine textured
5. salt flats, salty bottomland -- deep, fine textured, salt affected
6. malpais -- shallow, gravelly or stony, derived from basalt
7. soils of higher elevations (5,000 feet elevation) -- shallow, stony or cobbly, dark surfaced

Soils comprising the hills and breaks range sites make up over 90 percent of the areas at higher elevations (Western Plateau MLRA). Other soils making up the remaining range sites at higher elevations occur as small isolated areas, therefore were not included in this discussion. Technical Report VII includes physical and chemical parameters of all soils of the 3-County Area.

Soil Erosion

Climate, topography, ground cover, and physical soil properties (texture, coarse fragments, restrictive layers, etc.) are primary factors influencing the amount of sediment transported by runoff water. During an investigation of soil loss and sediment yields in the 3-County Area, Health Research Services and Analysis Inc. (1982) evaluated these factors and estimated sediment yields using the Pacific Southwest Interagency Committee (PSIAC 1968) methodology. (See Appendix C-2 for PSIAC methodology.) The investigation showed that nearly all of the 3-County Area falls within the stable and slight erosion condition class (0 to 0.5 acre-feet per square mile per year), with only a small area on the steep breaks of the Gila River Valley being in the moderate class (0.5 to 1.0 acre-feet per square mile per year). The breaks areas account for only about 1.7 percent of the 3-County Area (28,433 acres).

Table 2-6 shows erosion classes for the major range sites in the Resource Area. Soil erosion information in Dona Ana County is discussed in the Southern Rio Grande Grazing EIS, 1981. Visuals showing locations of range sites and vegetative subtypes in the 3-County Area are available for review in the Las Cruces District Office.

TABLE 2-6

RANGE SITES BY EROSION CONDITION CLASS[a/]

Stable 0 to 0.25 ac.ft./sq.mi./yr.	Slight 0.25 to 0.5 ac.ft./sq.mi./yr.	Moderate 0.5 to 1.0 ac.ft./sq.mi./yr.
Southern Desert MLRA	Southern Desert MLRA	Western Plateau MLRA
Bottomland	Gravelly	Breaks
Clayey	Gravelly Loam	
Deep Sand	Hills	
Draw	Limy	
Loamy		
Malpais	Western Plateau MLRA	
Salt Flats		
Sandy	Hills	

Sources: Health Research Services and Analysis, Inc., 1982.
BLM Las Cruces District Files, 1982.

Note: a/The shallow, gravelly, loamy, bottomland, clayey, and malpais range sites of the Western Plateau MLRA and the salty bottomland and gravelly sand of the Southern Desert MLRA occur as small isolated areas and combined, make up only about 1 percent of the 3-County Area. Therefore, sediment yields were not estimated for these areas.

Surface texture, coarse fragments, moisture content, and amounts of calcium salts in the soil are primary factors influencing a soil's erodibility by wind. Soils having similar properties that affect their resistance to soil blowing make up a Wind Erodibility Group (WEG). WEGs rate a soil from 1 to 8 (see Appendix C-3). Sandy soils rate 1 because of less resistance to wind erosion. Clayey and stony soils rate 8 because they have characteristics for greatest resistance to wind blowing. Soils of the sandy and deep sand range sites are most susceptible to erosion by wind, whereas soils of the bottomland and hills range sites are least susceptible. The WEG for each of the soil series in the 3-County Area is contained in Technical Report VII. The soil series are listed by range site. Soil erosion information in Dona Ana County is discussed in the Southern Rio Grande Grazing EIS (1981).

WILDLIFE

The 3-County Area (Grant, Hidalgo, and Luna Counties) was classified into habitat sites according to vegetation and landform (visuals showing locations of standard habitat sites in the 3-County Area are available for review in the Las Cruces District Office). Mapping lines were correlated with the units delineated in the 1981 soil-vegetation inventory. Habitat sites of the same type were combined into Standard Habitat Sites (SHS's), which are analyzed below. Various types of wildlife are discussed as they relate to these SHS's. A complete species list is found in Appendix D-3. Big game are discussed in the SHS's and separately. Game concentration areas are shown on Map 2-1. Threatened or endangered species and their habitat requirements are summarized in Table 2-11. Wildlife in Dona Ana County is discussed in the Southern Rio Grande Grazing EIS (1981). (See Appendix D-1 for methodology used in the wildlife section.)

Standard Habitat Sites (SHS's)

Table 2-7 summarizes the following data.

Creosote Rolling Upland (LADI RUP)

This SHS makes up 31 percent of the 3-County Area. Most of this SHS is in fair ecological condition with the remainder in poor. Plant diversity in this SHS is fairly low, but more than half the annual production is made up of grasses, forbs, and shrubs other than creosote. Small mammal diversity is one of the highest of any habitat, as is that of reptiles. Bird diversity is one of the lowest. Big game use is low with only a few pronghorn observations in creosote. Eight percent of mule deer sightings were made in this site, but this indicates only about one deer per ten sections (see Table 2-8). Game bird use also was low when compared to the size of the SHS.

Mixed Shrub Mountain (MXSH MTN)

Ten percent of the 3-County Area is made up of this type. Two-thirds of the SHS is in fair ecological condition with the remainder in poor. Plant diversity in mixed shrub mountain is one of the highest. Trees and shrubs make up half the plant community. By aspect, the most common plants are juniper, oak, beargrass, skunkbush, and mountain mahogany. Agave, banana yucca, pricklypear, and mariola also are common. Bird diversity is high, while mammals and reptiles have one of the lowest diversities in this site. Five species are reliant on this SHS as their principal habitat (see Table 2-7). The site is important for big game species. Bighorn sheep and ibex use it. Forty percent of white-tailed deer and 17 percent of mule deer sightings were in mixed shrub mountain. Mule deer use the habitat site more where there are edges and small openings (Wallmo 1978). Bighorn sheep also prefer more open areas where there is greater visibility (Sandoval 1978). Game bird numbers are low.

Mixed Shrub Rolling Upland (MXSH RUP)

This SHS makes up 11 percent of the 3-County Area. Typical plant species include Mormon tea, littleleaf sumac, soaptree yucca, and pricklypear, along with some creosote, snakeweed, and mesquite. Two-thirds of the plant composition is shrubs. Plant diversity is fairly low. These two factors are reflected in the ecological condition class: 54 percent poor, 44 percent fair, and only 2 percent good. Diversity of mammals and reptiles is high while that of summer birds is moderate. Where there is a more diverse plant structure and composition, bird diversity is higher. There is some big game use with 3 percent each of pronghorn, mule deer, and javelina sightings in this type. Game bird use is low.

Mixed Shrub Hill (MXSH HIL)

Only 3 percent of the 3-County Area is mapped as this SHS. Two-thirds of the type is in poor ecological condition, nearly one-third in fair, and the remainder (4 percent) in good. However, it does show good plant diversity. Forty-three percent of the composition is trees and shrubs, major species being banana yucca, oak, buckwheat, feather peabush, spicebush, and mariola. No summer bird transects were run in the SHS. Mammal and reptile diversity are high. The total number of species using the SHS is one of the lowest. Quail numbers appear to be fair, but mourning doves do not use the site much judging by observation data (see Table 2-8). Mule deer are the only big game species that were seen in significant numbers with 11 percent of the observations in this SHS, or approximately two deer per section.

Half-Shrub Rolling Upland (HASH RUP)

This SHS is named for the half-shrub snakeweed, which is dominant by aspect. Other common plant species are burro grass, gramas, tobosa, and scattered shrubs such as Mormon tea and yucca. The SHS makes up 10 percent of the 3-County Area. Most of the SHS is in poor ecological condition. Plant diversity and average number of plant species are some of the lowest of any habitat. This SHS is often considered to be a poor condition grass site and is comparable to that type of site because both have low plant species diversity. Bird diversity appears to be moderate, but there were too few transects to obtain an accurate representation. The number of bird species is actually very low, although the site is fairly valuable for nesting birds (see Table 2-9). Mammal diversity is also low, but reptile diversity is fairly high. Scaled quail use this habitat fairly often because it has some important winter food sources, such as snakeweed. Gambel's quail and mourning dove were seldom seen. Big game, except pronghorn, make little use of the site (see Table 2-8).

Mesquite Rolling Upland (PRGL RUP)

At 5 percent of the total area, this SHS is a small component of the 3-County Area. Most of this SHS (91 percent) is in poor ecological condition. It is low in plant species diversity. If snakeweed is included in the shrub count, three-fourths of the site is composed of trees and shrubs, indicating very little structural diversity. Reptile diversity is moderate. Bird diversity is probably low, but there is insufficient data to give an exact figure for birds or mammals. A few mule deer use the site. From observations, an estimate of about one deer per three sections can be made. Game bird sightings were also low in the SHS.

TABLE 2-8

GAME USE OF STANDARD HABITAT SITES

Standard Habitat Sites	Mule Deer per Section[a]	Percent of Observation Records					
		Pronghorn	Javelina	White-tailed Deer	Gambel's Quail	Mourning Dove	Scaled Quail
Creosote Rolling Upland	0.1	1	3	0	0	3	9
Mixed Shrub Mountain	0.8	0	3	40	5	4	4
Mixed Shrub Rolling Upland	0.1	3	3	0	3	2	3
Mixed Shrub Hill	1.9	1	0	0	4	1	7
Half-Shrub Rolling Upland	.05	28	0	0	0	1	19
Mesquite Rolling Upland	.4	0	0	0	1	4	1
Mesquite Sand Dune	0	0	0	0	0	1	2
Grass Flat	0	49	15	0	1	2	14
Grass Rolling Upland	.4	19	3	0	2	3	0
Grass Mountain	1.0	0	22	57	9	1	13
Pinyon-Juniper Grass Mountain	1.2	0	0	0	1	3	1
Pseudoriparian	4.6	0	18	0	13	5	17
Riparian	29.5	0	30	0	55	66	10
Oak Draw	18.6	0	3	0	4	5	1
Conifer Mountain	0	0	0	3	3	0	0

Source: BLM Las Cruces District Integrated Habitat Inventory Classification System Data, 1981.

Note: a/Based on observations of animals, tracks, and pellets. It is assumed that the heavy use of riparian sites by mule deer and javelina is partly accounted for by water availability. Some bias is probable since animals are more easily observed in open habitats. Deer numbers are based on the number of deer actually seen in a SHS divided by the total sections within the SHS.

TABLE 2-9

NESTING BIRD RATIOS

By Standard Habitat Site

	Percent in SHS	Weighted Average[a]
Creosote Rolling Upland	2	1
Mixed Shrub Mountain	3	1
Mixed Shrub Rolling Upland	11	1
Mixed Shrub Hill	3	1
Half-Shrub Rolling Upland	10	1
Mesquite Rolling Upland[b]	17	2
Grass Flat	3	1
Grass Rolling Upland	5	1
Pinyon-Juniper Grass Mountain	3	1
Pseudoriparian	11	11
Riparian	26	80
Oak Draw	3	2

By Nest Site

	Percent
Cottonwood	13
Sycamore	12
Other Deciduous Trees	10
Evergreen Trees	6
Soaptree Yucca	14
Cholla	8
Other Desert Shrubs	12
Special Habitat Features[c]	14
Ground Nests	11

Source: BLM Las Cruces District Integrated Habitat Inventory Classification System (IHICS) Data, 1981.

Notes: a/Weighted averages indicate how significant the percentage of nests is when compared to the total size of the Standard Habitat Site. Data from 1981 IHICS Data. Based on 133 nest reports.

b/Many nests reported from this SHS were found in abandoned buildings.

c/Includes buildings, cliffs, bridges, windmills, powerline poles, and mines.

Mesquite Sand Dune (PRGL SDN)

Mesquite dunes make up only 2 percent of the 3-County Area. Like the mesquite rolling upland, plant diversity is low. This type has the lowest average number of plant species. Correspondingly, bird diversity is one of the lowest. Reptile and mammal variety is also low, but mammal biomass is extremely high. On the Jornada, there are 840 pounds of rodent biomass per section in this type (Herbel 1982). A few observations of upland game birds came from the SHS. In years of good forb production, this site may be expected to support populations of quail. No big game use was recorded from this SHS.

Grass Flat (GR FLT)

Grass flats are differentiated from other grass sites by being located in drainages and having denser stands of tobosa and often sacatons and vine-mesquite. This SHS comprises 7 percent of the area. One percent of the SHS is in excellent ecological condition and 41 percent is in good condition. It is low in plant species and structural diversity, but one of the major shrub components is the soaptree yucca. This is a valuable plant for nesting birds, hosting a variety of raptors and passerine birds. Reptile and amphibian diversity is high, but summer bird diversity is low. Gambel's quail and mourning dove numbers are low, probably because of lack of shrub cover. However, 14 percent of the scaled quail sightings were in grass flats. It is significant that 15 percent of javelina and 49 percent of pronghorn sightings were in this SHS even though it is such a small proportion of the 3-County Area. Javelina sightings were most often made in tall grass sites with some shrub cover. Several animals on the state endangered list and four other vertebrate species are dependent on grass flats as their preferred habitat.

Grass Rolling Upland (GR RUP)

This SHS makes up 9 percent of the total area. Two-thirds is in fair ecological condition, 7 percent in good, and the remainder in poor. Plant diversity is moderate. Only 14 percent of the cover is shrubs; however, like grass flats, soaptree yucca is often an important component providing nesting sites for many birds. Summer bird and reptile diversities are low. Mammal data was insufficient to analyze. Two species are reliant on this SHS for preferred habitat. Upland game bird observations were low in the SHS, but big game is more closely tied to the site. Nineteen percent of pronghorn, 3 percent of javelina, and 8 percent of mule deer sightings were in this SHS.

Grass Mountain (GR MTN)

This SHS covers 9 percent of the 3-County Area with 20 percent in good ecological condition and 58 in fair condition. There is fairly good plant species and structural diversity. Although grass is dominant by weight, scattered shrubs and trees such as agave, sotol, Mormon tea, ocotillo, juniper, beargrass, and pricklypear are common. Small mammal diversity is low, but summer bird diversity is quite high. The SHS is important for quail and several big game species. More than half the white-tailed deer and 22 percent of javelina sightings came from this site. Mule deer also use it with a density of one deer per section calculated.

Pinyon-Juniper Grass Mountain (PJGR MTN)

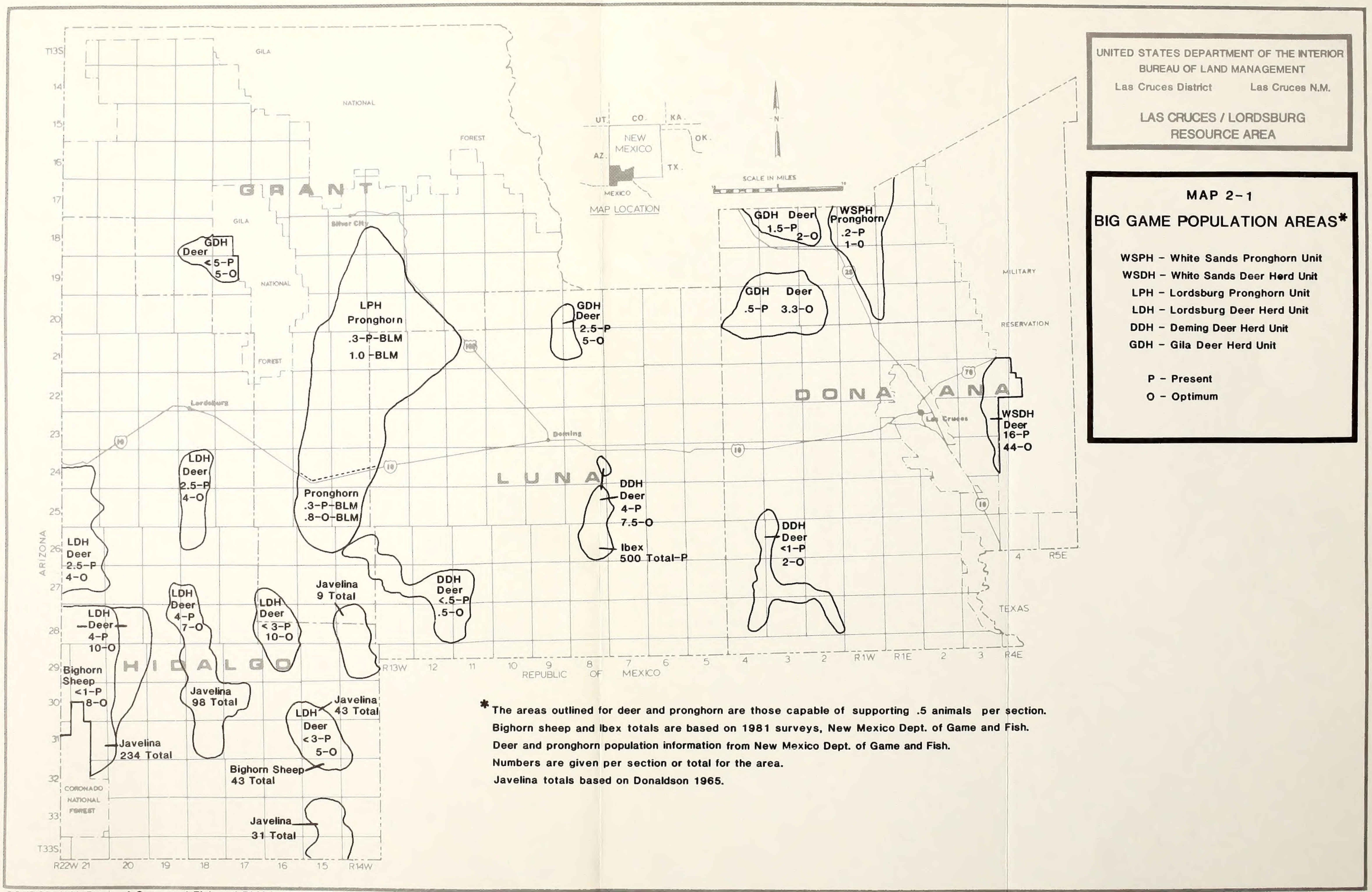
At 46,449 acres, this SHS is a very small component of the 3-County Area. It is peculiar in being a savannah woodland type with less shrub understory than the mixed shrub mountain SHS has. Plant diversity is fairly high, as is structural diversity. There is also a variety of grass species. The shrubs that are present are some of the more valuable wildlife foods: mountain mahogany, skunkbush, Fendlerbush, silktassel, and oak. Bird and mammal diversity is fairly high, reptile diversity lower. Ninety percent of the habitat is in poor ecological condition, because of the low forage quality of juniper and some grasses common in the SHS. Mourning doves were seen in significant numbers, but there were few quail. The SHS is valuable for mule deer with an estimate of 1.2 deer per section.

Pseudoriparian (PRIP)

Pseudoriparian refers to arroyos and drainages with ephemeral water and a variety of shrub and tree growth. Grass and forb cover is often sparse. Two-thirds of the composition is trees and shrubs with typical species being desert willow, hackberry, Apacheplume, littleleaf sumac, and mesquite. Most of the area (71 percent) is in poor ecological condition, primarily because there is so little grass understory. The lack of grass is partly due to grazing pressure, but also to the soil instability inherent in this SHS. Pseudoriparian covers less than 1 percent of the 3-County Area, yet it is extremely valuable. It has one of the highest summer bird and mammal diversities and is important nesting habitat. The total number of vertebrate species (205) using the habitat is very high. In spite of the small acreage, a high percentage of game bird observations came from this SHS along with 18 percent of javelina and 6 percent of mule deer sightings. Mule deer are estimated at 4.6 animals per section in this habitat.

Riparian (RIP)

This SHS is found along perennial streams and sometimes around permanent bodies of water. Cottonwoods, willows, and sycamores are the major tree species. The main riparian areas in the 3-County Area are the Gila River and its tributaries, Guadalupe Canyon, and San Simon Cienega (although very little riparian habitat is left at the Cienega due to a change in management policies and the resultant loss of artificial waters). Only 5,338 acres of this habitat were mapped, but it is the most valuable habitat in the 3-County Area. More vertebrate species (322) use this SHS than any other. Ninety-one are dependent on it as their sole habitat. Eighty percent (by weighted average) of reported nest sites were from this SHS. Twenty-eight Federal and state endangered species use riparian habitats. Most of the area (84 percent) is in poor ecological condition, with the remainder in fair condition. Guadalupe Canyon was not included in the above figures because no vegetation sampling was done. Hubbard (1977) noted particular problems in plant vigor, stand structure, and ground cover on the Gila River. More than half of the Gambel's quail and mourning dove sightings were made in riparian areas in spite of the minor acreages they comprise. This is also very important habitat for white-winged doves. Thirty percent of javelina and 14 percent of mule deer sightings came from riparian areas. Heavy big game use is attributable to water as well as forage availability.


GRANT
HIDALGO
LUNA
DONA ANA
GILA NATIONAL FOREST
GILA NATIONAL FOREST
CORONADO NATIONAL FOREST
MILITARY RESERVATION
ARIZONA
TEXAS
REPUBLIC OF MEXICO
Silver City
Lordsburg
Deming
Las Cruces
MAP LOCATION
UT. CO. KA. OK. AZ. NEW MEXICO TX. MEXICO
N
SCALE IN MILES
T13S
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
T33S
R22W 21
20
19
18
17
16
15
R14W
R13W
12
11
10
9
8
7
6
5
4
3
2
R1W
R1E
2
3
R4E
4
R5E
GDH Deer <5-P 5-O
LPH Pronghorn .3-P-BLM 1.0-BLM
Pronghorn .3-P-BLM .8-O-BLM
GDH Deer 2.5-P 5-O
GDH Deer 1.5-P 2-O
WSPH Pronghorn .2-P 1-O
GDH Deer .5-P 3.3-O
WSDH Deer 16-P 44-O
LDH Deer 2.5-P 4-O
LDH Deer 2.5-P 4-O
DDH Deer 4-P 7.5-O
Ibex 500 Total-P
DDH Deer <1-P 2-O
DDH Deer <.5-P .5-O
Javelina 9 Total
LDH Deer 4-P 7-O
LDH Deer < 3-P 10-O
LDH Deer 4-P 10-O
Bighorn Sheep <1-P 8-O
Javelina 98 Total
Javelina 234 Total
LDH Deer <3-P 5-O
Javelina 43 Total
Bighorn Sheep 43 Total
Javelina 31 Total

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces N.M.

LAS CRUCES / LORDSBURG
RESOURCE AREA

MAP 2-1
BIG GAME POPULATION AREAS*

WSPH - White Sands Pronghorn Unit
WSDH - White Sands Deer Herd Unit
LPH - Lordsburg Pronghorn Unit
LDH - Lordsburg Deer Herd Unit
DDH - Deming Deer Herd Unit
GDH - Gila Deer Herd Unit

P - Present
O - Optimum

*The areas outlined for deer and pronghorn are those capable of supporting .5 animals per section.
Bighorn sheep and Ibex totals are based on 1981 surveys, New Mexico Dept. of Game and Fish.
Deer and pronghorn population information from New Mexico Dept. of Game and Fish.
Numbers are given per section or total for the area.
Javelina totals based on Donaldson 1965.

SOURCE: N.M. Dept. of Game and Fish and BLM Las Cruces District Files 1982

TABLE 2-7

STANDARD HABITAT SITES COMPARISON DATA a/

Standard Habitat Sites	Acres in 3-County Area/ Percent of Total	Diversity Index Small Mammals	Diversity Index Summer Birds	Diversity Index Reptiles and Amphibians	Total Number of Vertebrate Species Using This SHS	Number of Vertebrate Species Reliant as Preferred	Diversity Index Plants	Average Number Plant Species	Percent Composition Trees and Shrubs by Weight b/	Percent in Good Ecological Condition Class	Percent in Fair Ecological Condition Class	Percent in Poor Ecological Condition Class
Creosote Rolling Upland	785,651/31	1.10	1.5	2.33	146	0	1.96	8.3	53	1	78	22
Mixed Shrub Mountain	240,036/10	.57	2.18	1.73	235	5	2.9	12.5	50	0	67	33
Mixed Shrub Rolling Upland	273,162/11	1.18	2.05	2.50	179	0	2.53	8.6	63	2	30	68
Mixed Shrub Hills	64,166/ 3	1.46	no data	2.39	113	0	3.19	12.5	43	4	30	66
Half-Shrub Rolling Upland	243,302/10	.79	2.0	2.47	134	0	1.55	5.1	18	4	35	61
Mesquite Rolling Upland	122,816/ 5	c/	1.50	2.00	150	0	1.41	6.6	61	3	6	91
Mesquite Sand Dunes	52,975/ 2	.91	1.51	2.20	140	0	1.01	4.6	43	0	33	67
Grass Flat	177,217/ 7	1.11	1.58	2.86	149	4	1.64	6.0	6	41d/	33	25
Grass Rolling Upland	235,045/ 9	c/	1.19	.94	151	2	2.59	11.2	14	9	56	35
Grass Mountain	234,208/ 9	.86	2.39	2.41	138	1	2.75	14.8	27	20	58	22
Pinyon-Juniper Grass Mountain	46,449/ 2	1.23	2.11	1.96	183	3	2.88	17.7	52	0	10	90
Pseudoriparian	15,092/ 1	1.50	2.71	1.86	205	1	2.69	13.1	69	0	29	71
Riparian	5,338/ 1	1.57	2.49	1.47	332	91	2.97	10.2	82	0	16	84
Oak Draw	1,826/ 1	.95	1.94	1.32	181	0	3.2	14.4	67	0	9	91
Conifer Mountain	1,789/ 1	.53	3.12	no data	134	6	no data	no data	no data	no data	no data	no data

Sources: BLM Las Cruces District Inventory Data, 1981-1982.
BLM IHICS Data, 1981.

Notes: a/See Appendix D-1 for methodology.

b/Snakeweed (Gutierrezia sarothrae) not included in shrub total.

c/Sample too small.

d/One percent excellent ecological condition in Grass Flat SHS.

Oak Draw

This is another small but significant SHS. There are only 1,826 acres of the type in the 3-County Area. It is found along rocky draws and is the extension of the pseudoriparian type at higher elevations. Typically, it is dominated by gray and Arizona white oaks, which make up most of the production, causing 91 percent of the area to be categorized in poor ecological condition. There is a fair amount of understory on some habitat sites; the number of plant species present is the highest of any SHS. Bird and mammal diversity is moderate. Upland game bird use appears to be low, but adjusting for the size of the SHS, it may be an important area for Gambel's quail and mourning doves. Javelina use the area, and mule deer sightings are high, accounting for 18 deer per section. It is some of the best habitat for white-winged dove, band-tailed pigeons, and Montezuma quail, all uncommon birds in the 3-County Area.

Conifer Mountain (CON MTN)

No quantitative plant data is available for this SHS because it was not transected. Typical tree species are ponderosa pine, oak, pinyon, and juniper with an understory of mountain mahogany. Gramas and a variety of other grasses are found along with many forbs. The entire SHS (1,789 acres) is in northern Grant County on land contiguous with the Gila National Forest. It is extremely valuable habitat, having the highest summer bird diversity of all habitats. Six species use this SHS exclusively. However, there are millions of acres of similar habitat in the adjacent national forest, making any special emphasis on this SHS unreasonable. Elk and white-tailed deer were observed in the habitat. It is likely that goshawks nested there in 1981 because two juveniles were found in the area.

Special Habitat Features

Special habitat features (SHFs) were inventoried during wildlife surveys (Grant, Hidalgo, and Luna Counties in 1981, Dona Ana and a small portion of Luna in 1978). Special features are either man-made, such as windmills and dirt tanks, or natural, such as cliffs and playas. Those features identified in the 1981 survey are summarized in Table 2-10.

TABLE 2-10

SPECIAL HABITAT FEATURES

Type of Special Habitat Feature	Typical Species Associated With This Special Feature	Number of Features Inventoried	Number of Species Observed
cliff	raptors, swifts, bats	7	25
seep	passerine birds, coyotes, deer, amphibians	2	5
cold spring	owls, passerine birds	9	32
temporary pond/playa	shore birds	1	9
building	owls, passerine birds, coyotes, rabbits, bats	4	8
mine	owls, kestrels, bats	2	7
windmill	raptors, passerine birds, coyotes, big game	152	126
stock pond	ducks, game birds, passeriform birds, bats, coyotes, deer and antelope, amphibians	76	108
guzzler	game birds, passerine birds	2	2

Source: BLM Las Cruces District IHICS Data, 1981.

The value and significance of these features is difficult to quantify. Cliffs and rock outcrops, one of the most important features, are found areawide. They are always potential nesting sites for a variety of raptors and several smaller birds, such as white-throated swifts. They provide den sites for carnivores, bat roosts, and are habitat for a wide variety of rock-dwelling wildlife.

Several mountain ranges within the Resource Area have extensive cliffs with known nest sites for golden eagles, prairie falcons, and other raptors. The most important of these are the Alamo Huecos, Cooke's Range, Floridas, Gila River cliffs, and Organ Mountains.

Water sources of all types are extremely important to wildlife as is evidenced by the number of species seen at these features. Not only do they provide water, but often cover as well. Generally, a greater diversity of plants, including many trees, grow around these waters than in surrounding rangelands.

Playas are another important SHF. The most extensive playas are found between Lordsburg and the Arizona state line, in the Animas Valley. Late summer rains usually fill these and this coincides with the migration of many waterfowl and shorebirds along the Pacific flyway. The playas provide a resting point for these birds. The figures in Table 2-10 reflect only a small portion of the variety of birds that use the playas during migration.

Big Game

Big game numbers are not high overall in the Resource Area, but a variety of species are found including desert bighorn sheep, mule and white-tailed deer, ibex, javelina, and pronghorn. Map 2-1 shows specific herd areas identified by the New Mexico Department of Game and Fish (NMDGF) in the LCLRA.

Desert bighorn sheep, once widespread in the Resource Area, are now found only in the Big Hatchets and southern Peloncillos. The Hatchet sheep are a native herd which numbered 150 in the 1950's. Several years of drought and the resultant competition with deer and livestock were probable causes of the sheep herd's decline. By the late 1960's, less than 25 bighorn sheep remained (Sandoval 1981). Their numbers have remained low; this can probably be attributed to predation. In 1979, the NMDGF transplanted 11 bighorn sheep from the Redrock Game Farm into the Hatchets to supplement the native herd. As of August 1981, there were 43 bighorn sheep in the two groups. Desert bighorns were reintroduced into the Peloncillos in 1981. Ten rams from Redrock and 12 ewes from Arizona were put into the area at the same time. This herd has also met with difficulties since the Arizona sheep proved to be pneumonia carriers. They were immune to the disease, but passed it to the rams. However, the ewes were bred before the rams died, and several ram lambs have been born. Four rams also have been brought from Arizona to supplement the herd.

It is apparent that desert bighorn sheep populations in New Mexico are fragile. The two herds discussed are the only major ones remaining in the state, except for the San Andres herd which has been severely reduced by scabies. NMDGF has added these sheep to the state endangered species list. Isolated sightings of bighorn sheep have been reported from other parts of the Resource Area. It is possible that a small herd exists in the military portion of the Organ Mountains. NMDGF may supplement this herd, if it does indeed exist. The agency also wants to study the Cooke's Range, the Lower Gila Box, and the Cowboy Spring Rim northeast of Animas Mountain, to see if any of these areas are suitable for future transplants. A Habitat Management Plan (HMP) is in preparation for the Big Hatchet-Alamo Hueco area. Planned actions in the HMP would protect and improve bighorn sheep habitat. There are unconfirmed bighorn sheep sightings from the Alamo Huecos and NMDGF plans to transplant sheep into this range. Disease is apparently one of the major limiting factors for sheep. With their numbers so low, predation is another, although it should not be significant for sizeable populations. Forage competition with deer and cattle is a third factor, as indicated by past history in the Hatchets. Fecal samples have been collected for sheep, deer, and cattle in the Hatchets in several different years. Shrubs are important for sheep, with cactus, mountain mahogany, winterfat, and oak showing up in large amounts. Forbs and grasses are also present in significant quantities. Deer also show high use on the same forbs, oak, and mountain mahogany. These forbs, grass, and winterfat also make up a high proportion of cattle diets (BLM Fecal Analysis files).

Javelina are found as far east as the Floridas and north past the Gila River. Their main concentrations are in southern Hidalgo County (see Map 2-1). Most javelina sightings were from pseudoriparian and grass mountain SHS's (BLM 1981). Pinyon-juniper grass mountain is also important habitat (Donaldson 1965). Donaldson's feeding observations of javelina demonstrated the importance of several plant species: pricklypear, agave, ocotillo, sotol, beargrass, and mast of juniper, oak, and pinyon. Several annual forbs also appeared to be important: filaree, hog potato, and wild onion. A study in Texas showed evidence that mesquite pods are also an important food source (Everitt, et al 1981). Generally, cattle are not significant food competitors for javelina.

A herd of Iranian ibex, an exotic, occupies the Florida Mountains. Beginning in 1970, seven releases totaling 73 animals were made in the range. During a 1981 aerial census, 432 animals were counted by NMDGF. Since all animals are not usually counted on a flight, the actual population may be as high as 500. A HMP for the Floridas specifies that a final carrying capacity will be set in 1985. The Florida Mountains ibex are mainly browsers with 75 percent of their diet composed of mountain mahogany, silktassel, and oak. Deer in the Floridas show a preference for the same foods. When held to proper numbers, ibex use a different habitat type than deer, remaining in the rugged, steep cliffs. This could eliminate much interspecific food competition. Cattle fecal samples from the Floridas showed that 16 percent of their diet was composed of the above three browse species (Woodroof 1979). Since cattle are seldom at the higher elevations, no competition would be expected with reasonable numbers of ibex.

Small pronghorn herds are found in the Resource Area. Several herds remain almost entirely on private land. Pronghorn are scattered throughout the public land in small numbers, but the only herd on public land is found between Silver City and Hachita. The major use area is found on private land with scattered public land. There is some well-blocked public land, south of I-10, within the herd use area. Grass flat, grass rolling upland, and half-shrub rolling upland are the most important SHS's for pronghorn. Yoakum (1980) analyzed several food habit studies and concluded that pronghorn diets consist of 71 percent shrubs, 22 percent forbs, and 7 percent grass. However, he noted that in years of high forb production, pronghorn eat more forbs than those numbers indicate. It is probable that survival rates are tied to forb production. This would indicate that competition with livestock is likely, especially on poorer ranges where cattle are also dependent on forbs. Yoakum has also analyzed the height of ground cover on preferred pronghorn range. The best pronghorn areas have vegetation with a mean height of 15 inches. Areas with taller vegetation are less frequently used. Again, cattle may have an effect on pronghorn if their grazing alters the height structure.

Mule deer are found areawide. Herds shown on Map 2-1 are those capable of supporting at least .5 deer per square mile. Coues' white-tailed deer are not differentiated from mule deer on the map. The range of Coues' deer in New Mexico is limited to the Gila and Black Range (north of the Resource Area), the Burros, and southern Hidalgo County.

White-tailed deer were seen only in three SHS's: grass, mixed shrub, and conifer mountain. The conifer mountain SHS is found only at the southern edge of the Black Range. Mule deer also were found in grass and mixed shrub mountain, but they also commonly used lower elevation habitats such as mixed shrub hill, pseudoriparian, and riparian. These habitat preferences are similar to those found in a deer study in southeastern Arizona. There the white-tails were more common in shrub and conifer types at higher elevations while the mule deer could be found in the same areas but also in desert shrub types (Anthony and Smith 1977). The authors suggested that white-tails may be less socially tolerant of cattle than mule deer.

Deer fecal analysis does not separate white-tailed and mule deer (BLM Files). The results show diets high in several browse species: silktassel, mountain mahogany, oak, and sumac. A number of forbs also show up in significant proportions, including globemallow and bladderpod. The Arizona study demonstrated that white-tails used more plant species, suggesting that they may be more adapted to undisturbed or climax communities, which usually have more species diversity. They ate more grass and forbs than mule deer. The authors theorized that mule deer would be favored where cattle use is heavy because they are more opportunistic eaters and can survive on a less varied diet.

Bryant et al. (1981), in a Texas study, also found that white-tails thrived on a diverse diet and ate more grass and forbs where they were available. In the Guadalupe Mountains of New Mexico, juniper and yucca were important in mule deer diets, but were inadequate as diet staples because they did not supply enough digestible protein (Anderson, et al 1965). All these studies suggest that there is competition between deer and cattle. This competition may affect species distribution (mule deer vs. white-tails) and actual survival rates of deer where competition is severe. Forage quality may affect survival, but is probably sufficient to support deer.

In the Floridas, competition between deer and ibex may now exist. It appears that ibex numbers may be high enough that they are moving into normal deer habitat. Several other factors may also limit deer. In some herd areas, there is a shortage of water. Deer are then confined to areas close to existing water, where the forage may be overutilized. In localized areas, shrubs may be too dense. Deer prefer ecotonal areas and openings are lacking in some shrub habitats.

Fish

The only significant fisheries habitat in the 3-County Area is the Gila River and some of its perennial tributaries. While a number of native species remain, the composition has been altered by introduction of game fishes (LaBounty n.d.). Modification of stream habitat also sometimes favors non-native fishes (Bureau of Reclamation 1981).

A number of endemic fishes are still found in the Gila River system. Six native species have been found in the Middle or Lower Boxes recently: Gila roundtail, spikedace, longfin dace, loach minnow, Gila sucker, and Gila mountain sucker (Wisdom 1982). The spikedace and loach minnow are candidates for the Federal endangered species list. These two and the Gila roundtail are also on the state endangered list. Flooding is an important mechanism of the aquatic habitat. It both supports riparian vegetation and regulates the exotic fish community (Bureau of Reclamation 1981). A fish species list based on the most recent survey work done by the NMDGF (1981) is found in Appendix D-3.

Threatened or Endangered Fauna Species

Table 2-11 lists Federal and state endangered fauna species in the LCLRA. Preferred habitat, general distribution, and management recommendations are summarized in the table.

GEOLOGY AND MINERAL RESOURCES

The LCLRA is structurally complex. Most of the area lies within the Mexican Highlands section of the Basin and Range Physiographic Province, with the northern edge of the Resource Area lying within the transition zone of the Colorado Plateau. The area is characterized by widespread volcanics, igneous intrusions, intermontane basins, Basin and Range block fault mountain ranges, and the Rio Grande rift.

Basalt cinder cones and lava flows are especially prevalent in the West Potrillos, Aden Crater area, Sierra de Las Uvas, and the Animas Valley. Various other volcanic rocks (rhyolites, latites, dacites, and andesites) are common throughout the Resource Area. Intrusive igneous rocks of varying composition occur in the Resource Area and are most prominent in the Organ Mountains, Dona Ana Mountains, Cooke's Range, Tres Hermanas Mountains, Florida Mountains, Pyramid Mountains, Little Hatchet Mountains, Animas Mountains, and Peloncillo Mountains. The broad valleys are all composed of Quaternary alluvium.

Sedimentary rocks (mostly of marine origin) are common in the fault block mountain ranges. The most prominent exposures occur in the East Potrillo Mountains, Robledo Mountains, and Peloncillo Mountains. The most prominent structural feature in the Resource Area is the Rio

TABLE 2-11

FEDERAL AND STATE ENDANGERED SPECIES WITH THEIR PREFERRED WILDLIFE HABITATS

Common Name and Status	Scientific Name	LADI RUP[a]	MXSH MTN	MXSH RUP	MXSH HILL	HASH RUP	PRGL RUP	PRGL SDN	GRASS FLT	GRASS RUP	GRASS MTN	PJGR MTN	PRIP	RIP	OAK DRAW	CON MTN	Geographic Distribution/Comments	Management
Southern yellow bat NM2[b]	Lasiurus ega xanthinus													x			Guadalupe Canyon	Habitat protection; collecting limitations
Western mastiff bat NM2	Eumops perotis californicus		x											x			Guadalupe Canyon	Protect cliff habitat
White-sided jackrabbit NM1	Lepus callotis gaillardi								x	x							Animas and Playas Valleys; probably not on Federal land	Habitat preservation and restoration
Coatimundi NM2	Nasua narica molaris		x									x		x	x		Hidalgo County	Habitat protection; protection from indiscriminate killing
Desert bighorn sheep NM1	Ovis canadensis mexicana		x								x						Big Hatchets, Peloncillos, possibly Organs	Protect animals from disturbance
Olivaceous cormorant NM2	Phalacrocorax olivaceus													x			Gila Valley	Protect habitat; stands of drowned trees
Mississippi kite NM2	Ictinia mississippiensis													x			Migrants in Gila Valley	Protect habitat
Gray hawk NM1	Buteo nitidus maximus													x			Gila Valley, San Simon Cienega	Protect habitat; protect birds from persecution
Black hawk NM1	Buteogallus anthracinus anthracinus													x			Gila Valley	Habitat protection; protect birds from persecution
Bald eagle FE;NM2	Haliaeetus leucocephaus													x			Winters and migrates occasionally in lower Gila Valley	Habitat protection; protect from persecution
Caracara NM1	Polyborus cheriway auduboni												x	x			Infrequent in area	Protect any nests found
Peregrine falcon FE;NM1	Falco peregrinus		x								x	x		x		x	No known eyries in Resource Area	Protect eyries if found; protect prey base
Aplomado falcon NM1	Falco femoralis septentrionalis								x	x							No known nests in Resource Area; formerly nested there.	Protect birds from persecution and disturbance
(Mexican) turkey NM2	Meleagris gallopavo mexicana		x									x			x		Southern Hidalgo County	Protect habitat
Whooping crane FE;NM2	Grus americana								Any SHS								Stock tanks, fields	Protect bird from disturbance
Ridgway's whip-poor-will NM2	Caprimulgus ridgwayi		x											x			Only in Guadalupe Canyon	Habitat protection
Violet-crowned hummingbird NM2	Amazilia violiceps ellioti													x			Only in Guadalupe Canyon	Habitat protection
Broad-billed hummingbird NM2	Cynanthus latirostris													x			Only in Guadalupe Canyon	Habitat protection
Coppery-tailed trogon NM1	Trogon elegans canescens		x											x			Southern Hidalgo County	Protect bird from disturbance
Gila woodpecker NM2	Melanerpes uropygialis uropygialis													x			Grant and Hidalgo Counties riparian areas	Habitat protection
Red-headed woodpecker NM2	M. erythrocephalus caurinus													x			Occasional in Gila Valley	Habitat protection
Thick-billed kingbird NM2	Tyrannus crassirostris pompalis													x			Southern Hidalgo County	Habitat protection
Sulphur-bellied flycatcher NM1	Myiodynastes luteiventris swarthi													x			Vagrant in New Mexico	Habitat protection; prevent human disturbance
Buff-breasted flycatcher NM1	Empidonax fulvifrons pygmaeus											x				x	Grant County; no sightings	Little data on species' requirements
Beardless flycatcher NM1	Camptostoma imberbe ridgwayi													x			Guadalupe Canyon	Protect habitat

TABLE 2-11 (concluded)

FEDERAL AND STATE ENDANGERED SPECIES WITH THEIR PREFERRED WILDLIFE HABITATS

Common Name and Status	Scientific Name	LADI RUP[a/]	MXSH MTN	MXSH RUP	MXSH HILL	HASH RUP	PRGL RUP	PRGL SDN	GRASS FLT	GRASS RUP	GRASS MTN	PJGR MTN	PRIP	RIP	OAK DRAW	CON MTN	Geographic Distribution/Comments	Management
Bell's vireo NM2	Vireo bellii												x	x				Protect habitat
Varied bunting NM2	Passerina versicolor dickeyae												x	x			Southern Hidalgo County	Protect habitat
Baird's sparrow NM2	Ammodramus bairdii								x	x							Animas Valley	Protect habitat
Yellow-eyed junco NM2	Junco phaeonotus palliatus		x									x			x	x		Protect habitat; prevent disturbance during breeding season
McCown's longspur NM2	Calcarius mccowni								x	x								Winter resident; protect grass cover
Bunchgrass lizard NM2	Sceloporus scalaris		x								x	x					Southern Peloncillos	Prevention of overgrazing
Mountain skink NM2	Eumeces callicephalus		x							x		x			x		Guadalupe Canyon	Protection against killing and collecting
Giant spotted whiptail NM2	Cnemidophorus burti strictogrammus		x														Guadalupe Canyon	Protection against collecting; preserve dense shrubby habitat
Dixon's whiptail lizard NM2	C. dixoni					x				x	x						Limited area in Hidalgo County	Protection from collecting
Gila monster NM1	Heloderma suspectum	x		x	x								x	x			Boulders and thick brush	Protection from collecting
Trans-Pecos rat snake NM2	Elaphe subocularis suspectum	x		x	x												Dona Ana County	Protection from collecting
Narrow-headed garter snake NM2	Thamnophis rufipunctatus													x			Gila River and tributaries	Habitat protection; protect snake from killing and collecting
(Sonora) coachwhip NM2	Masticophis flagellum cingulum					No SHS Information											May occur in Guadalupe Canyon	Protect all whipsnakes from destruction
Sonora mountain kingsnake NM2	Lampropeltis pyromelana pyromelana		x									x			x	x	Grant and Hidalgo Counties	Protection against killing and collecting
(Arizona black) western rattlesnake NM2	Crotalus viridis cerberus		x									x					Grant County	Protection against killing and collecting
Colorado river toad NM2	Bufo alvarius	x	x	x			x	x						x	x		Usually near permanent water	Protect against collecting; protect localized habitat
Roundtail chub NM2	Gila robusta grahami													x			Gila River System	Preserve water levels
Spikedace FC;NM2	Meda fulgida													x			Gila River System	
Loachminnow FC;NM2	Tiaroga cobitus													x			Gila River System	Maintain habitat--gravelly riffles
Mexican tetra NM2	Astyanax mexicanus													x			Rio Grande--Dona Ana County	Watershed protection to minimize erosion and resultant siltation

Sources: Hubbard et al, 1979.
BLM Integrated Habitat Inventory Classification System data, 1981.

Notes: a/See Standard Habitat Site Description.

b/Status Codes:
FC -- Federal Candidate
FE -- Federal Endangered
NM1 -- State Endangered
NM2 -- State Threatened

Grande rift, a tensional or pull-apart feature in the earth's crust. The rift extends form southern Colorado to Texas and lies within the eastern portion of the Resource Area.

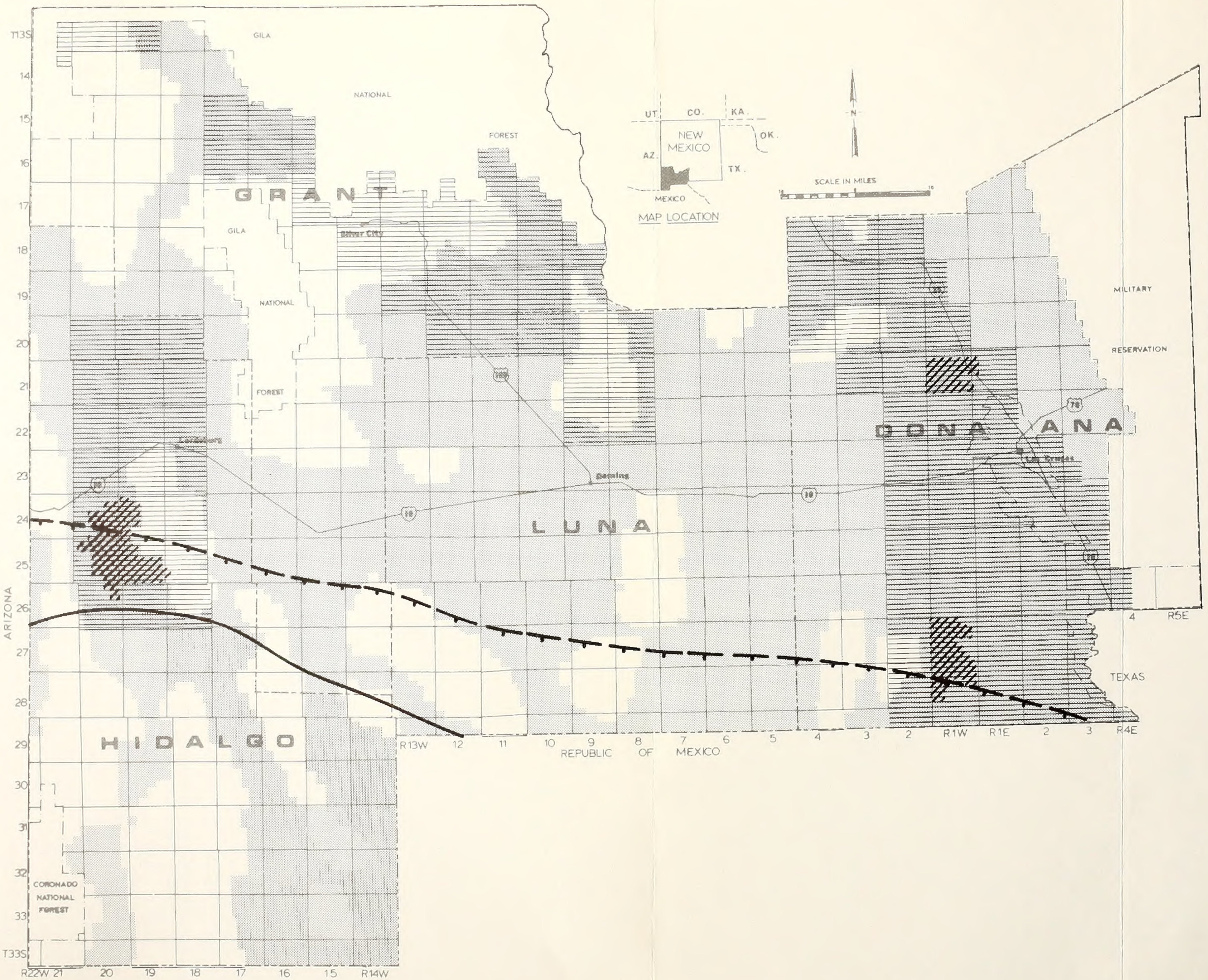
Several areas in the Resource Area have high potential for geothermal energy (see Map 2-2). The greatest potential is associated with the Rio Grande rift. The potential for direct use applications in the Las Cruces Area is high. Several local industries are planning to develop geothermal resources for space and domestic water heating. New Mexico State University is currently utilizing geothermal energy for direct use applications. Two commercial greenhouses are being heated with hot water in the Animas Valley southwest of Lordsburg.

There are three Known Geothermal Resource Areas (KGRAs) in the Resource Area: Kilbourne Hole, southwest of Las Cruces; Lightning Dock, southwest of Lordsburg; and Radium Springs, north of Las Cruces. During the period from 1976 through 1979, these and other areas received extensive exploration. This resulted in the delineation of target areas considered to have the highest potential. The Radium Springs area appears to have the highest potential in the Resource Area. After intensive geophysical exploration in this area, several test wells were drilled. According to industry representatives, temperatures at Radium Springs may be high enough for electrical power generation. Geothermal exploration in the Resource Area since 1980 has been minimal relative to previous years. Currently, there is active interest in the area east and southeast of Las Cruces where geophysical exploration, including the drilling of shallow temperature gradient holes, is occurring.

Possible oil and gas accumulations occur in the basins of the Resource Area and are associated with the Pedregosa Basin in Mexico and the Overthrust Belt in Utah and Wyoming. Both areas are shown on Map 2-2 and are proven high producers. Compared to other areas of New Mexico, the Resource Area is relatively unexplored for oil and gas and has no producing wells. Drilling of test wells averages less than one per year and until about 1975, geophysical exploration was minimal. The area is, however, experiencing a significant increase in exploration. Similarities between southwestern New Mexico and the producing Overthrust Belt in Utah and Wyoming have stimulated much interest. Virtually all of the basins in the Resource Area are undergoing geophysical exploration. This will probably lead to identification of target areas and the drilling of wildcat wells.

Saleable minerals are widespread throughout the Resource Area. Extensive deposits of sand and gravel occur along the Rio Grande Valley and other major drainages. Most of the sand and gravel produced in the Resource Area comes from the Las Cruces vicinity and other portions of Dona Ana County. Building stone and volcanic cinders are other saleable minerals that are mined, mostly in Dona Ana County. Caliche, usually used for surfacing roads, is common throughout the Resource Area.

Locatable mineral deposits occur in most of the mountain ranges of the Resource Area. There are numerous mining districts in these areas. Most of the districts produced ore during the late 1800's and early 1900's and are now dormant except for a few small producing mines.


GRANT
GILA
NATIONAL
FOREST
Silver City
Lordsburg
Deming
LUNA
DONA ANA
Las Cruces
HIDALGO
CORONADO
NATIONAL
FOREST
MILITARY
RESERVATION
TEXAS
ARIZONA
REPUBLIC OF MEXICO
UT.
CO.
KA.
AZ.
NEW MEXICO
OK.
TX.
MEXICO
MAP LOCATION
N
SCALE IN MILES
T13S
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
T33S
R22W 21
20
19
18
17
16
15
R14W
R13W
12
11
10
9
8
7
6
5
4
3
2
R1W
R1E
2
3
R4E
4
R5E

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces N.M.

LAS CRUCES / LORDSBURG
RESOURCE AREA

MAP 2-2

AREAS WITH ENERGY MINERALS POTENTIAL

- ▒ **PROSPECTIVELY VALUABLE FOR OIL AND GAS**
- ▥ **BEST POTENTIAL FOR OIL AND GAS**
- ▤ **PROSPECTIVELY VALUABLE FOR GEOTHERMAL RESOURCES**
- ▨ **KNOWN GEOTHERMAL RESOURCE AREA**
- ┬┬ **PEDREGOSA BASIN**
- — **OVERTHRUST BELT EROSIONAL LIMIT**

SOURCE: MMS and BLM Las Cruces District Files 1982

Currently, many of these areas are undergoing additional exploration. The major ore minerals associated with these districts include, but are not limited to, fluorspar, barite, copper, lead, zinc, gold, silver, iron, and manganese. The Resource Area contains many of the minerals listed on the National Stockpile Inventory of Strategic and Critical Minerals.

Many of the mining districts contain ore deposits that are not currently economical to mine but could become so if economic conditions change. For instance, if a mineral commodity price increases to a value that makes mining it economically feasible, or if the United States is suddenly denied a crucial source of a strategic or critical mineral, renewed exploration will occur.

LIVESTOCK GRAZING

There are 262 grazing allotments within the Grant, Luna, and Hidalgo County Area. Of this total, 122 are within the grazing district boundary and have set grazing capacities for each allotment. The remaining allotments are outside the grazing district boundary, grazing use is covered by a lease, and livestock numbers are not controlled. Livestock, owned by 188 livestock operators, utilize the forage on these allotments and leases. Fenced allotments contain intermingled unfenced parcels of state, private (controlled and uncontrolled), and public lands. A few allotments also include Forest Service land. Most allotments are divided into pastures with water developments in each pasture. Those located on state and private lands are usually base waters. Numerous watering facilities, authorized by rangeland improvement permits or cooperative agreements, are located on public land. For information pertaining to livestock grazing in Dona Ana County, see Appendix E-2 in the Southern Rio Grande Grazing EIS (1981). Allotments in Dona Ana County include all of the Las Uvas and Organ Planning Units, and a small part of the Caballo Planning Unit (which includes allotments 6009, 6010, 6016, 6023, 6024, 6032, 6035, 6061, 6062, 6069, 6145, and 6146).

Based on the Las Cruces/Lordsburg range inventory data (1981-1982), approximately 5 percent or 79,509 public land acres are considered unsuitable for livestock use due to steep slopes (greater than 70 percent) or barren areas (less than 2 percent vegetation). The remaining 95 percent (1,556,894 public land acres) are considered suitable for livestock use.

Production Practices, Type of Operation, Period of Use, Class of Livestock

Fifteen allotments are under implemented Allotment Management Plans (AMPs). AMP allotments are on a deferred rotation grazing schedule set up in cooperation with individual permittees. The schedules allow for deferment on one or more pastures for a growing season or a complete year's rest. Yearlong grazing is the common practice in most of the 3-County Area, but many ranches practice some type of rotation, deferment, or a combination grazing program (Gray, Jones, and Fowler 1981).

Licensed grazing use consists of cattle and a few saddle horses on each allotment (see Appendix F-1 for acreage and forage allocation by allotment). Cow-calf operations predominate. Yearlong breeding programs are common. Registered bulls are used when possible to produce replacement heifers. Calving percentages normally range from 70 to 83 percent (BLM Las Cruces District Economics Files 1982). Peak calving season is usually from late February to early April (Gray, Jones, and Fowler 1981).

Major breeds of cattle are Hereford, Brangus, and Angus. Crossbreeding of livestock is increasing in popularity. Cows of these breeds weigh from 850 to 1,000 pounds. Heifer calves weigh from 430 to 441 pounds when marketed; steer calves from 437 to 460 pounds (BLM Las Cruces District Economics Files 1982). Some operators graze yearlings to give themselves marketing flexibility. Operations that run yearlings exclusively are uncommon. Yearling heifers, when sold, average 558 to 630 pounds and steers from 620 to 660 pounds (BLM Las Cruces District Economic Files 1982). Death losses due to predators, poisonous plants, or calving are minimal.

Production Problems

Major factors affecting livestock production in the 3-County Area are drought, livestock distribution and stocking rates, and high operating costs with a fluctuating livestock market.

Droughts are a fact of life and the major limiting factor of livestock production in the 3-County Area. Forage production is directly related to the timing and amount of precipitation. Rainfall from April through September governs the growing season for rangeland forage (Herbel and Gould 1980). Average rainfall is 8-10 inches. Rainfall records show more years of below average rainfall than average or above average rainfall. Drought influences many characteristics of vegetation such as vigor, production, composition, cover, and mortality (Pieper and Donart 1975). Frequent and prolonged drought tends to lower conception rates, calf weaning weights, and daily weight gains for yearlings.

Livestock distribution and stocking rates are two interrelated problems facing the livestock operator. Flexible stocking rates can be worked out with the permittee to take advantage of additional forage or, if necessary, temporary non-use during drought years. Poor distribution is evidenced by uneven utilization patterns within pastures. Livestock move over any pasture in response to the number and location of watering facilities, topography, forage, and size of pasture (Herbel and Gould 1980). Salting, protein supplements, fencing, shading, and rubbing posts can be used to improve livestock distribution. Water becomes the limiting factor-determining grazing patterns. Additional waters and other rangeland developments can redistribute grazing animals. Proposed rangeland developments are listed in Appendix F-4 and F-5.

Operating costs increased in 1980 due to high interest rates and inflation. This prevented the rancher from building needed rangeland developments. Normal operating costs for gas, oil, veterinary bills, etc. have escalated while the livestock market has fluctuated. During 1980, rising interest rates on operating expenses have also had a negative effect on the income to livestock operations.

WATER RESOURCES

Surface Water

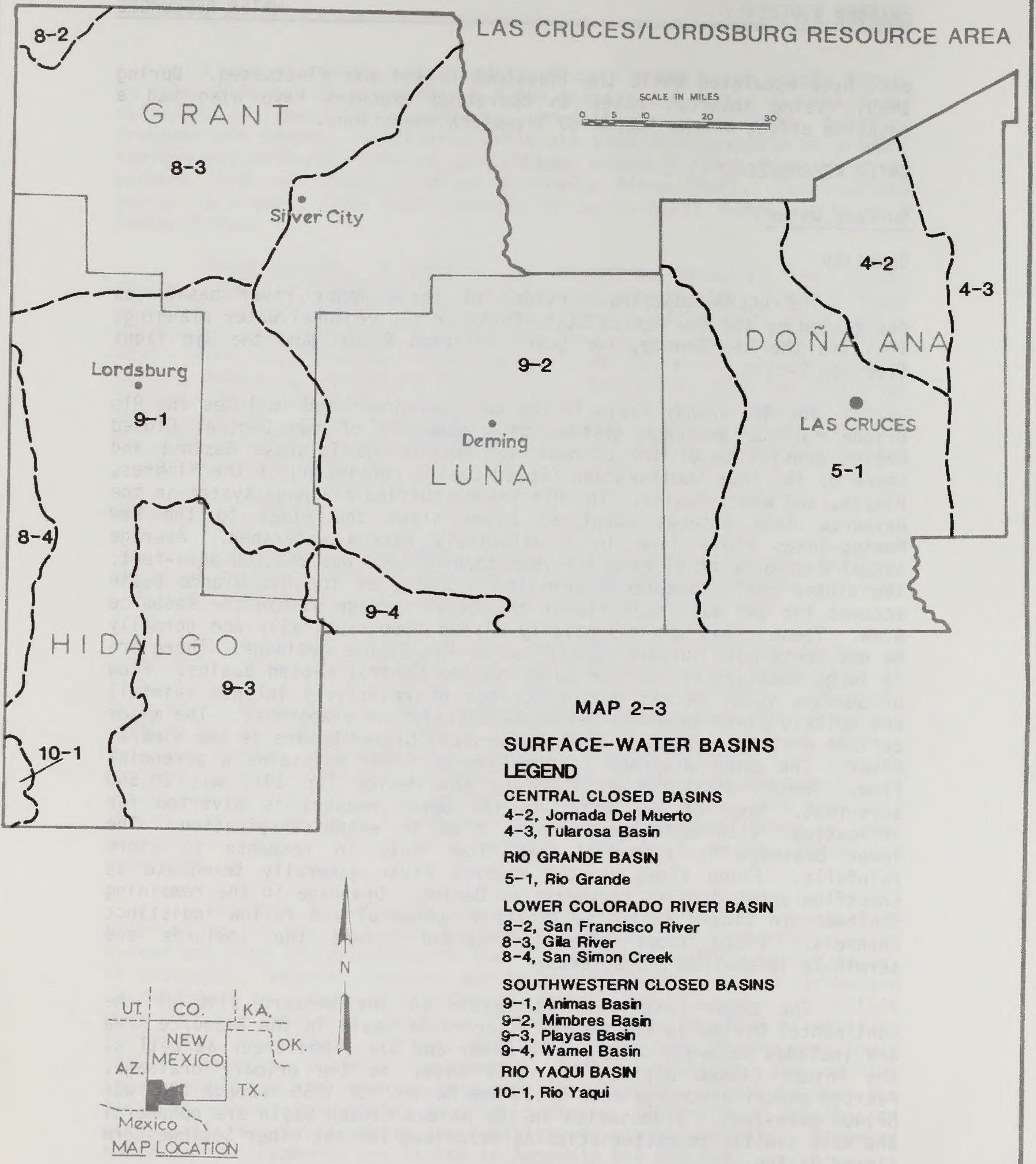
Quantity

The LCLRA contains portions of three major river basins as designated by the New Mexico State Engineer for regional water planning. They are the Rio Grande, the Lower Colorado River, and the Rio Yaqui (see Map 2-3).

The Rio Grande Basin is the most prominent and includes the Rio Grande surface drainage system, plus segments of two Central Closed Basins consisting of the Jornada del Muerto and Tularosa Basins; and three of the four Southwestern Closed Basins consisting of the Mimbres, Playas, and Wamel Basins. The Rio Grande surface drainage system in the Resource Area extends about 85 miles along the river to the New Mexico-Texas state line in a relatively narrow watershed. Average annual discharge at El Paso for 1938 through 1980 was 363,700 acre-feet. The closed basins located within the boundary of the Rio Grande Basin account for the vast majority of the total acreage within the Resource Area. These areas are essentially closed topographically and normally do not contribute surface runoff to the Rio Grande drainage. There are no large supplies of surface water in the Central Closed Basins. Flow of surface water occurs during periods of relatively intense rainfall and quickly sinks into the permeable alluvium or evaporates. The major defined drainage system in the Southwestern Closed Basins is the Mimbres River. The upper drainage of the Mimbres River maintains a perennial flow. Annual discharge at Mimbres, New Mexico for 1979 was 20,550 acre-feet. Most of the water in the upper reaches is diverted for irrigation, with additional losses tied to evapotranspiration. The lower drainage is ephemeral and flows only in response to storm rainfalls. Flood flows in the Mimbres River generally terminate as sheetflow about 8 miles southeast of Deming. Drainage in the remaining Southwestern Closed Basins is strictly ephemeral and follow indistinct channels. Flood flows generally spread across the lowlands and terminate in shallow playa lakes.

The Lower Colorado River Basin on the western side of the Continental Divide is the second major river basin in the Resource Area and includes segments of the Gila River and San Simon Creek as well as the Animas Closed Basin. The Gila River is the primary drainage. Average annual discharge near Gila, New Mexico for 1956 through 1965 was 87,400 acre-feet. Tributaries in the Animas Closed Basin are ephemeral and have similar characteristics as described for the other Southwestern Closed Basins.

The Rio Yaqui Basin, located in the far southwestern corner of New Mexico, is the third major river basin within the Resource Area and


LAS CRUCES/LORDSBURG RESOURCE AREA
SCALE IN MILES
0 5 10 20 30
GRANT
DOÑA ANA
LUNA
HIDALGO
8-2
8-3
8-4
9-1
9-2
9-3
9-4
4-2
4-3
5-1
10-1
Silver City
Lordsburg
Deming
LAS CRUCES
N
UT.
CO.
KA.
NEW MEXICO
OK.
AZ.
TX.
Mexico
MAP LOCATION

MAP 2-3

SURFACE-WATER BASINS

LEGEND

CENTRAL CLOSED BASINS
4-2, Jornada Del Muerto
4-3, Tularosa Basin

RIO GRANDE BASIN
5-1, Rio Grande

LOWER COLORADO RIVER BASIN
8-2, San Francisco River
8-3, Gila River
8-4, San Simon Creek

SOUTHWESTERN CLOSED BASINS
9-1, Animas Basin
9-2, Mimbres Basin
9-3, Playas Basin
9-4, Wamel Basin

RIO YAQUI BASIN
10-1, Rio Yaqui

SOURCE: N. M. State Engineer, 1980 - BLM Las Cruces District Files 1982 includes Guadalupe Canyon. The basin contains only 40 square miles in New Mexico and streamflow occurs in response to heavy rainfall.

That part of precipitation that manifests itself as flow in surface streams is known as runoff. The annual runoff is the total runoff produced by the many rains during the year. The estimated mean annual runoff for the LCLRA ranges from 1 inch in the mountains to 0.1 inch in the valleys. The variability of runoff from place to place and from year to year is largely associated with corresponding variations in precipitation. Intense thundershowers during July through September generally contribute 50 percent of the annual rainfall, and most of the annual runoff occurs during this period.

A methodology developed by the Soil Conservation Service (SCS) can be used to estimate volume and peak rates of runoff from small watersheds for different storm events (see Appendix G-1). The kind of soil, type of vegetation, and amount of ground cover have a major effect on the amount of precipitation that runs off. Assuming similar soils and equal storm frequencies and duration, watersheds dominated by grass vegetation have lower estimated runoff rates than watersheds of equal size dominated by creosote vegetation. This difference in runoff reflects different patterns of on-site utilization of water, and is significant because runoff is the primary force in initiating erosion and transporting sediment. Table 2-12 presents estimated values for flood runoff events of different frequencies for the major soil units in the Resource Area.

TABLE 2-12

MAGNITUDE OF FLOOD RUNOFF EVENTS
IN THE LAS CRUCES/LORDSBURG RESOURCE AREA[a/]

Range Site	2-Year	10-Year	25-Year
Hills	203	440	672
Gravelly	5.6	53	112
Loamy	36	114	165
Clay	104	280	392
Sandy	4.4	41	84

Source: Health Research Services and Analysis, Inc., 1982.

Note: a/Values are peak runoff in cubic-feet per second per square mile resulting from 6-hour precipitation on a one square mile watershed.

Quality

Surface water quality in the LCLRA is moderately hard and alkaline with relatively low levels of sodium, chloride, and sulphate. Salinity, as measured by total dissolved solids (TDS), is also low except in the playa lakes within several of the closed basins where the TDS are between 1,000 and 3,000 milligrams per liter (mg/l), and the water can be considered slightly saline. The Gila River has low sediment loads during base flows, but can transport an excess of 200 tons per day of sediment during high flows (measured at Redrock). The Mimbres River, with a relatively small watershed that supports perennial flow, normally transports less than 1 ton per day of sediment even in high flows (measured at Mimbres, New Mexico). Sediment loads for the Rio Grande, measured at El Paso, Texas, are in excess of 800 tons per day during high flows in early spring and summer. There are no data available on the quantity of sediments in the Central and Southwestern Closed Basins due to the ephemeral nature of the streams and their location in remote undeveloped areas. Water quality data for the major drainages is contained in Technical Report IX.

The primary use of water by the BLM is by livestock and wildlife. Water quality samples collected from numerous stockwater impoundments and major streams in the 3-County Area indicate that the water is below the recommended upper limits for livestock and wildlife, as established by the Environmental Protection Agency (see Appendix G-2).

Quality standards for surface water in New Mexico have been adopted by the Water Quality Control Commission to protect and sustain designated uses. General quality standards apply at all times to all surface waters of the state which are suitable for recreation and support desirable aquatic life. Parameters of particular importance that are covered include: floating solids; oil and grease; plant nutrients; hazardous substances; pathogens and turbidity. Additionally, certain stream segments have more stringent standards that apply to designated uses of the surface water within a specified stream reach. In the LCLRA, there are six stream segments, two each on the Rio Grande, Gila, and Mimbres Rivers, that have use designations and standards (see Appendix G-3). The water quality for these stream segments is generally within state standards, however, there are recognized problems. The Rio Grande and Gila Rivers both transport heavy sediment loads during high flows. Along the Gila River, fecal coliform bacteria is near the upper limit during low flows, and is close to not supporting secondary contact recreation. The Mimbres River has pH and temperature levels above the standards during base flows.

Groundwater

Quantity

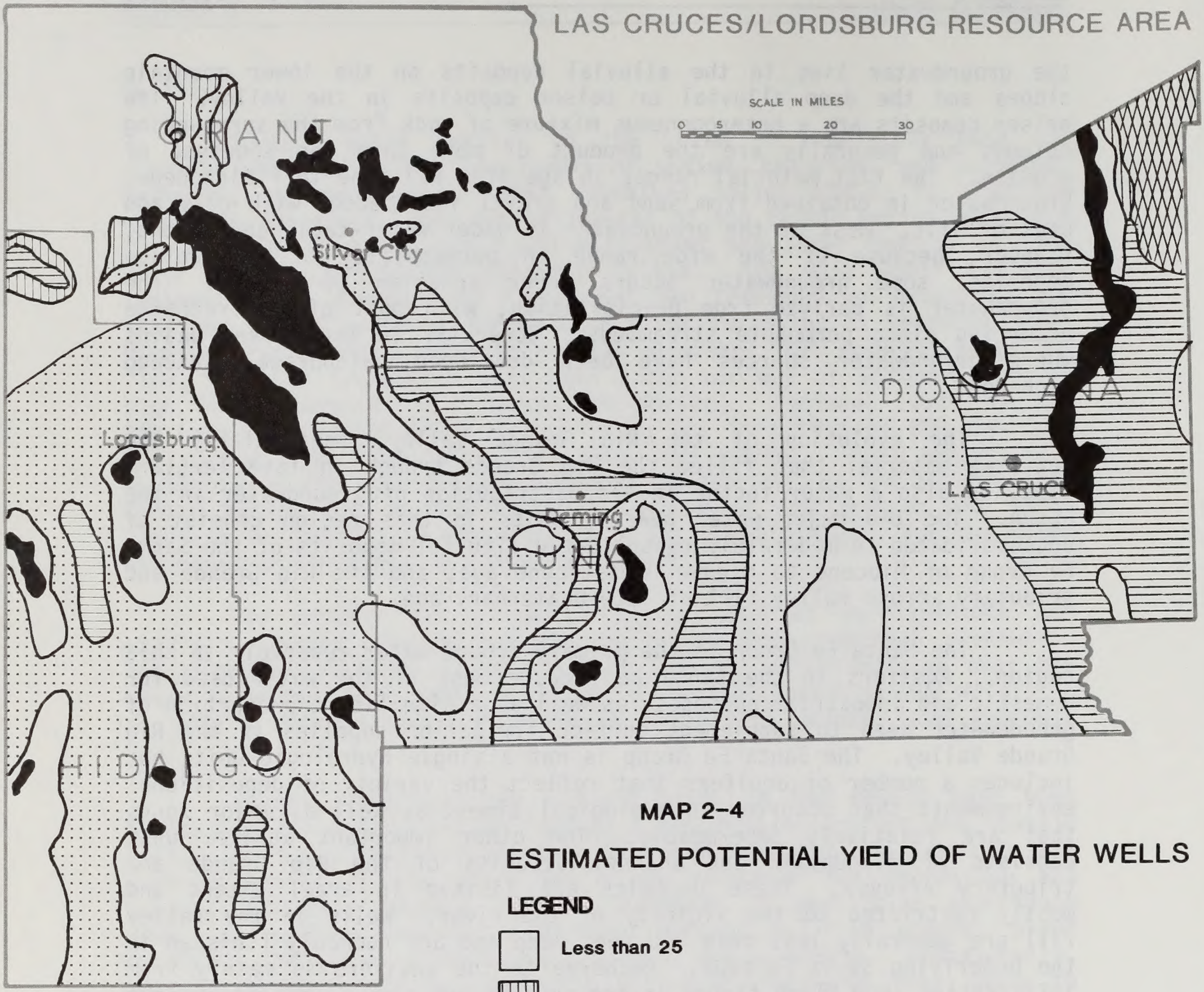
The LCLRA is within the Basin and Range Physiographic Province and is characterized by north-trending subparallel mountain ranges separated by basins filled with alluvial material. This is an important characteristic when considering regional groundwater supply. Most of the groundwater lies in the alluvial deposits on the lower mountain slopes and the deep alluvial or bolson deposits in the valley. The bolson deposits are a heterogeneous mixture of rock from the surrounding uplands and generally are the product of more than one sequence of erosion. The fill material ranges in age from Pliocene to Pleistocene. Groundwater is obtained from sand and gravel interbedded with clay and beds of silt. Most of the groundwater is under water-table conditions, however, because of the wide range in permeability of the bolson deposits, some groundwater occurs under artesian conditions. The groundwater is derived from precipitation, with most of the recharge occurring along permeable streambeds. Generally in the closed basins where groundwater sources have been developed, withdrawals exceed recharge.

The evolution of the Rio Grande Valley, particularly the detrital material that filled the Rio Grande trough in late Tertiary time, is also a major factor in the distribution of groundwater in the LCLRA. The two major water bearing units in this region consist of unconsolidated to moderately consolidated alluvial deposits of the Santa Fe Group of Miocene to middle Pleistocene age, and the Rio Grande and tributary arroyo valley fill of late Quaternary age.

The Santa Fe Group is the primary ground water reservoir in this region. Aquifers in the Santa Fe produce most of the water used for domestic and industrial purposes, as well as a significant proportion of groundwater used to supplement surface irrigation supplies in the Rio Grande Valley. The Santa Fe Group is not a single hydrologic unit, but includes a number of aquifers that reflect the variety of depositional environments that occurred in geological times, as well as major zones that are relatively impermeable. The other important aquifer unit consists of floodplain and channel deposits of the Rio Grande and tributary arroyos. These deposits are limited in areal extent and mostly restricted to the vicinity of the river. Wells in the valley fill are generally less than 200 feet deep and are commonly finished in the underlying Santa Fe beds. Recharge to the aquifers is mainly from infiltration from flash floods in the arroyos and some infiltration from perennial streams that occupy the upper reaches of several major arroyos.

Secondary sources of groundwater in the LCLRA are found in low porosity sedimentary rocks of early Tertiary age, consisting of conglomerates, sandstones, and shales. The effective porosity is along joints, fissures, and faults. Yields from the few wells penetrating the sedimentary rocks are low, rarely exceeding a few gallons per minute.

Estimated potential yield of water wells in the LCLRA is shown on Map 2-4. Water wells are assumed to be properly located, constructed and developed. General depth to groundwater is shown on Map 2-5. More comprehensive and detailed information on groundwater is contained in individual basin reports available for review at the Las Cruces District Office.

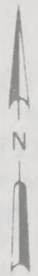

LAS CRUCES/LORDSBURG RESOURCE AREA
SCALE IN MILES
0 5 10 20 30
GRANT
Silver City
Lordsburg
Deming
LUNA
DONA ANA
LAS CRUCE
HIDALGO

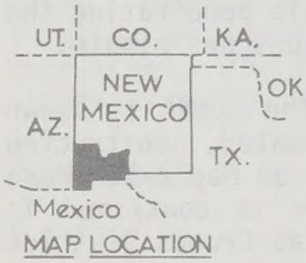
MAP 2-4

ESTIMATED POTENTIAL YIELD OF WATER WELLS

LEGEND

□	Less than 25
▥	25 to 100
⠿	100 to 500
▤	More than 500
▩	Areas where ground water generally contains more than 3,000 milligrams per liter dissolved solids
■	Areas of outcrop of granite quartzite, rhyolite, large masses of intrusive rocks and metamorphic sedimentary rocks. Locally the rocks are dry.

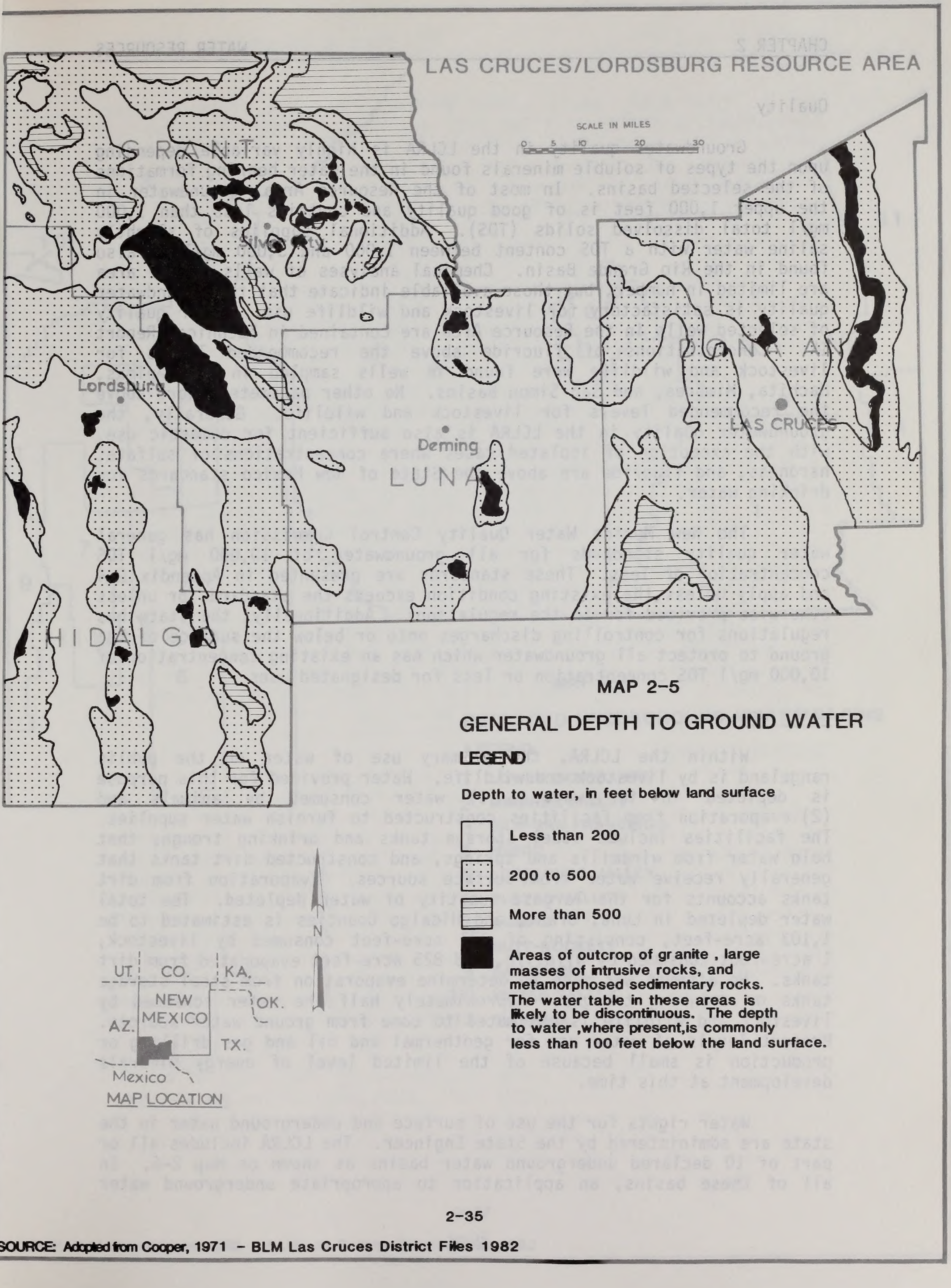



UT.
CO.
KA.
NEW MEXICO
OK.
AZ.
TX.
Mexico
MAP LOCATION

Area wells are generally capable of yielding quantities of water, in gallons per minutes, within the range indicated.

Water wells are assumed to be properly located, constructed, and developed and to tap aquifers that contain water with a dissolved solids content of less than 3,000 milligrams per liter.

SOURCE: USGS, 1972 - BLM Las Cruces District Files 1982


LAS CRUCES/LORDSBURG RESOURCE AREA
SCALE IN MILES
0
5
10
20
30
GRANT
Silver City
Lordsburg
Deming
LUNA
DONA ANA
LAS CRUCES
HIDALGO
N
UT.
CO.
KA.
NEW MEXICO
OK.
AZ.
TX.
Mexico
MAP LOCATION

MAP 2-5

GENERAL DEPTH TO GROUND WATER

LEGEND

Depth to water, in feet below land surface

- ☐ **Less than 200**
- ▒ **200 to 500**
- ▤ **More than 500**
- ■ **Areas of outcrop of granite, large masses of intrusive rocks, and metamorphosed sedimentary rocks. The water table in these areas is likely to be discontinuous. The depth to water, where present, is commonly less than 100 feet below the land surface.**

SOURCE: Adapted from Cooper, 1971 - BLM Las Cruces District Files 1982

Quality

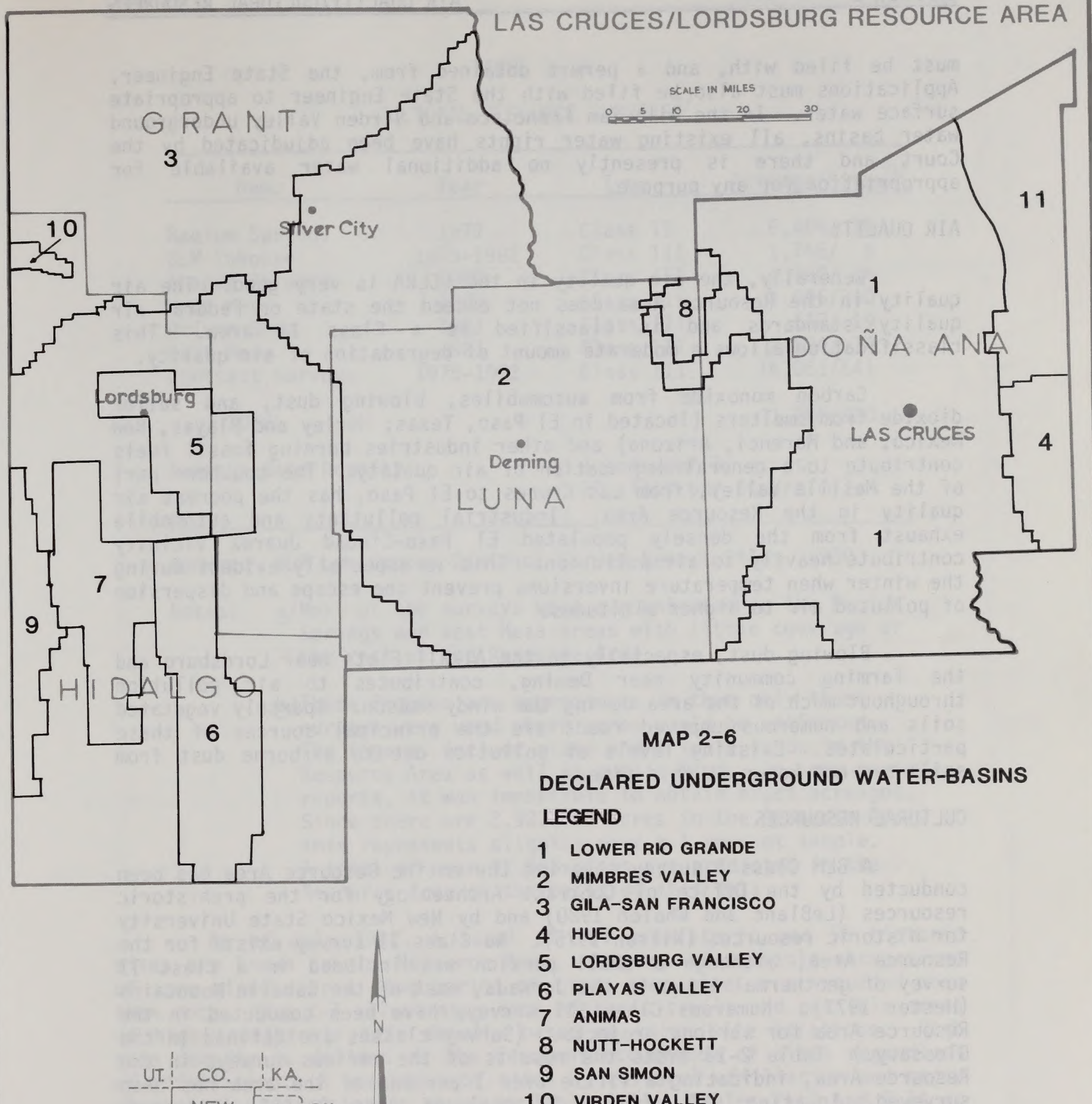
Groundwater quality in the LCLRA is highly variable depending upon the types of soluble minerals found in the water bearing formations of the selected basins. In most of the Resource Area, groundwater in the upper 1,000 feet is of good quality and contains less than 1,000 mg/l total dissolved solids (TDS). Additional supplies of slightly saline water with a TDS content between 1,000 and 3,000 mg/l is also found in the Rio Grande Basin. Chemical analyses of wells in the area are limited in number, but those available indicate that the groundwater quality is satisfactory for livestock and wildlife use. Water quality of selected wells in the Resource Area are contained in Technical Report IX. Concentrations of fluoride above the recommended limits for livestock and wildlife were found in wells sampled in the Animas, Hachita, Mimbres, and San Simon Basins. No other parameters were above the recommended levels for livestock and wildlife. Generally, the groundwater quality in the LCLRA is also sufficient for domestic use, with the exception of isolated cases where concentrations of sulfate, hardness, and fluoride are above the State of New Mexico standards for drinking water.

The New Mexico Water Quality Control Commission has general water quality standards for all groundwater of 10,000 mg/l TDS concentration or less. These standards are presented in Appendix G-4 and apply unless the existing condition exceeds the standard, or unless otherwise provided for in the regulations. Additionally, the state has regulations for controlling discharges onto or below the surface of the ground to protect all groundwater which has an existing concentration of 10,000 mg/l TDS concentration or less for designated uses.

Water Use

Within the LCLRA, the primary use of water on the public rangeland is by livestock and wildlife. Water provided for this purpose is depleted in two ways: (1) water consumed by animals and (2) evaporation from facilities constructed to furnish water supplies. The facilities include steel storage tanks and drinking troughs that hold water from windmills and springs, and constructed dirt tanks that generally receive water from surface sources. Evaporation from dirt tanks accounts for the largest quantity of water depleted. The total water depleted in Luna, Grant, and Hidalgo Counties is estimated to be 1,103 acre-feet, consisting of 277 acre-feet consumed by livestock, 1 acre-foot consumed by wildlife, and 825 acre-feet evaporated from dirt tanks. No attempt was made to determine evaporation from steel storage tanks or drinking troughs. Approximately half the water consumed by livestock and wildlife is estimated to come from ground water sources. Present levels of water use for geothermal and oil and gas drilling or production is small because of the limited level of energy minerals development at this time.

Water rights for the use of surface and underground water in the state are administered by the State Engineer. The LCLRA includes all or part of 10 declared underground water basins as shown on Map 2-6. In all of these basins, an application to appropriate underground water


GRANT
3
10
Silver City
8
1
DOÑA ANA
2
Lordsburg
LAS CRUCES
5
4
Deming
LUNA
1
11
7
9
HIDALGO
6
SCALE IN MILES
0
5
10
20
30
N
UT.
CO.
KA.
NEW MEXICO
OK.
AZ.
TX.
Mexico
MAP LOCATION

LAS CRUCES/LORDSBURG RESOURCE AREA

MAP 2-6

DECLARED UNDERGROUND WATER-BASINS

LEGEND

1 LOWER RIO GRANDE
2 MIMBRES VALLEY
3 GILA-SAN FRANCISCO
4 HUECO
5 LORDSBURG VALLEY
6 PLAYAS VALLEY
7 ANIMAS
8 NUTT-HOCKETT
9 SAN SIMON
10 VIRDEN VALLEY
11 TULAROSA

SOURCE: N. M. State Engineer, 1980 - BLM Las Cruces District Files 1982 must be filed with, and a permit obtained from, the State Engineer. Applications must also be filed with the State Engineer to appropriate surface water. In the Gila-San Francisco and Virden Valley underground water basins, all existing water rights have been adjudicated by the Court and there is presently no additional water available for appropriation for any purpose.

AIR QUALITY

Generally, the air quality in the LCLRA is very good. The air quality in the Resource Area does not exceed the state or Federal air quality standards and is classified as a Class II area. This classification allows a moderate amount of degradation of air quality.

Carbon monoxide from automobiles, blowing dust, and sulfur dioxide from smelters (located in El Paso, Texas; Hurley and Playas, New Mexico; and Morenci, Arizona) and other industries burning fossil fuels contribute to a general degradation of air quality. The southern part of the Mesilla Valley, from Las Cruces to El Paso, has the poorest air quality in the Resource Area. Industrial pollutants and automobile exhaust from the densely populated El Paso-Ciudad Juarez vicinity contribute heavily to air pollution. This is especially evident during the winter when temperature inversions prevent the escape and dispersion of polluted air to higher altitudes.

Blowing dust, especially in the Alkali Flats near Lordsburg and the farming community near Deming, contributes to air pollution throughout much of the area during the windy season. Sparsely vegetated soils and numerous unpaved roads are the principal sources of these particulates. Existing levels of pollution due to airborne dust from soils are not known at this time.

CULTURAL RESOURCES

A BLM Class I survey covering the entire Resource Area has been conducted by the Office of Contract Archaeology for the prehistoric resources (LeBlanc and Whalen 1980) and by New Mexico State University for historic resources (Wilson 1975). No Class II survey exists for the Resource Area, although a small portion was included in a Class II survey of geothermal areas in the Jornada, east of the Caballo Mountains (Hester 1977). Numerous Class III surveys have been conducted in the Resource Area for various projects. (Survey classes are defined in the Glossary.) Table 2-13 lists the results of the various surveys in the Resource Area, indicating a little over 1 percent of the area has been surveyed, locating 980 sites. A total of over 91,555 sites are projected for the entire Resource Area based on Table 2-13.

TABLE 2-13

CULTURAL RESOURCE SURVEYS[a/]

Name	Year	Type	Acreage/Sites[b/]
Radium Springs	1977	Class II	6,400/ 36
BLM Inhouse	1975-1982	Class III	1,766/ 6
Anapra Airport	1980	Class III	1,700/ 24
West Mesa	1982	Class III	1,905/340
Prison Site	1981	Class III	640/ 19
East Mesa	1981	Class III	2,834/ 14
Contract Surveys	1975-1982	Class III	16,051/541
TOTAL			31,296/980
Average Site Density		1 site per 32 acres 20 sites per square mile	

Source: BLM Las Cruces District Survey Report Files, 1980.

Notes: a/Most of the surveys were concentrated in the Radium Springs and West Mesa areas with little coverage of the rest of the Resource Area.

b/These figures are approximate in that only those surveys were used where acres could be estimated. The figures include state and private lands in the Resource Area as well as public land. In some survey reports, it was impossible to obtain exact acreages. Since there are 2,923,789 acres in the Resource Area, this represents slightly over a 1 percent sample. A total of over 91,555 sites are predicted in the Resource Area on the basis of this data.

As of July 1982, a total of 764 prehistoric and 50 historic sites are known in the Resource Area. Because of multiple occupations of some sites over a long period of time, some sites are recorded more than once. Map 2-7 illustrates some historic trails and possible areas of high prehistoric site density based on known site locations. High site density is defined as the frequent occurrence of sites regardless of affiliation. A breakdown of sites by cultural affiliation and major chronological division is shown in Table 2-14. Tables 2-13 and 2-14 do not correlate in total site numbers because the sites on the West Mesa and East Mesa have not been incorporated into the BLM site files and many sites on Table 2-14 were recorded on other than Class III surveys. Table 2-15 correlates known cultural sites with the major vegetation categories in the Resource Area. This table indicates that the majority of the sites have been recorded in the mesquite (63 percent of the recorded sites) and creosote (28 percent of the recorded sites) zones. The physical condition and agents of deterioration of the sites in the Resource Area are tabulated in Table 2-16, indicating that most sites are in fair condition, while there is no information for many sites. Erosion and pothunting have been the most significant agents of deterioration to sites in the Resource Area.

TABLE 2-14

CULTURAL PERIODS AND RESOURCE AFFILIATION
IN THE LAS CRUCES/LORDSBURG RESOURCE AREA

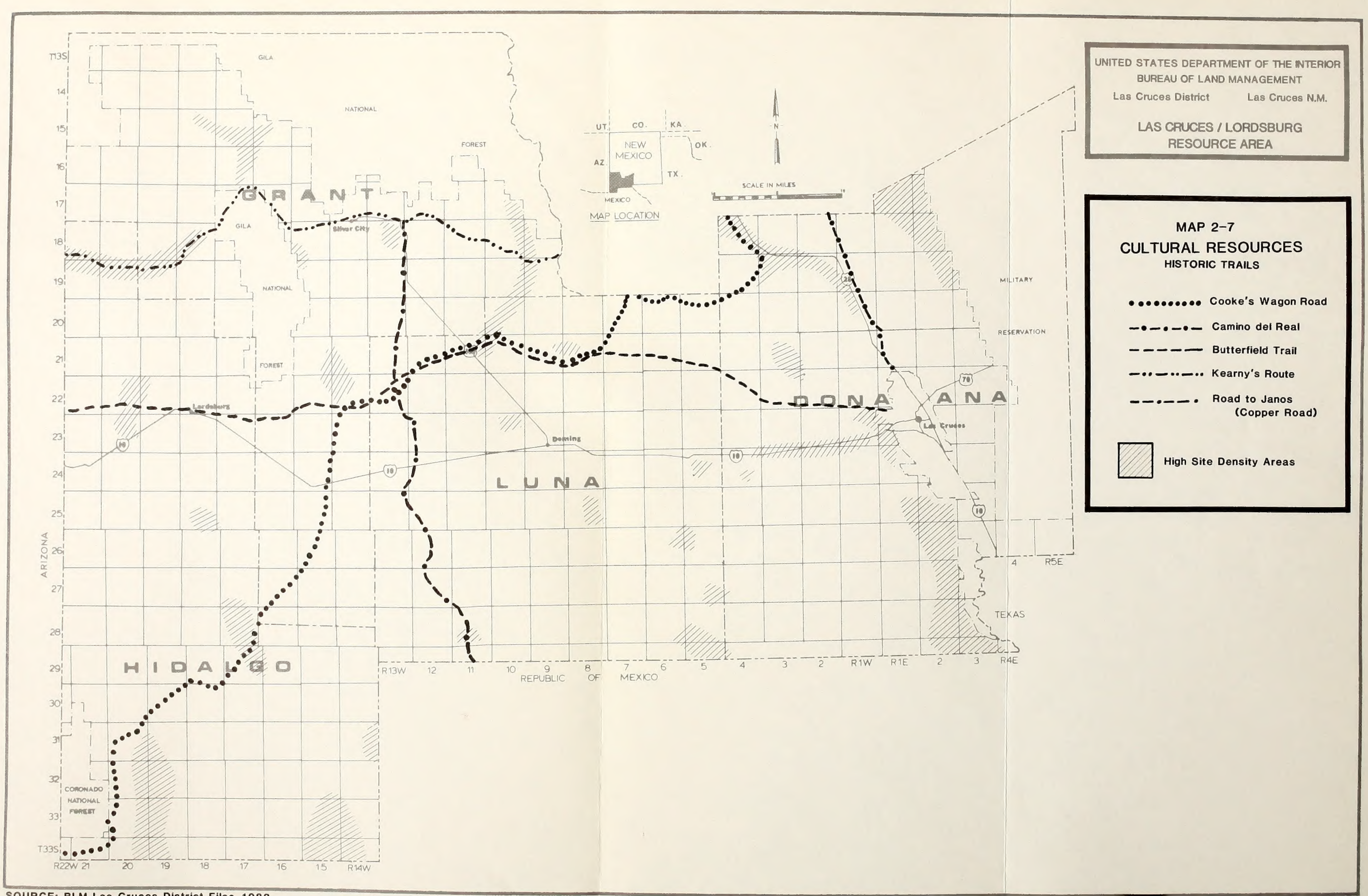
Affiliation	Date[a/]	Total Number of Sites in Resource Area[b/]	Percent of All Sites in Resource Area
Paleo Indian	13,500 BC - 7000 BC	5	00.6
Archaic	7000 BC - 200 BC	70	08.6
Pithouse (Mogollon)[c/]	200 BC - 1000 AD	80	09.8
Pueblo (Mogollon)	1000 AD - 1450 AD	156	19.2
Mogollon (no period)	200 BC - 1450 AD	186	22.8
Historic	1581 AD - Present	50	06.1
Lithic Scatter	all prehistoric periods	123	15.1
Indeterminate	all prehistoric periods	118	14.5
Multicomponent	all prehistoric periods	26	03.2
TOTAL		814	

Sources: Whalen and LeBlanc, 1980; BLM Las Cruces District Files, 1982.

Notes: a/Many of these dates may be altered by further archaeological and historical studies.

b/Total number is based on the 764 prehistoric and 50 historic sites in the Resource Area.

c/Mogollon includes both the Jornada and Mimbres tradition of the Mogollon.



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces N.M.

LAS CRUCES / LORDSBURG
RESOURCE AREA

MAP 2-7
CULTURAL RESOURCES
HISTORIC TRAILS

Cooke's Wagon Road
Camino del Real
Butterfield Trail
Kearny's Route
Road to Janos (Copper Road)
High Site Density Areas
GRANT
LUNA
HIDALGO
DONA ANA
GILA
NATIONAL
FOREST
CORONADO NATIONAL FOREST
MILITARY RESERVATION
Silver City
Lordsburg
Deming
Las Cruces
ARIZONA
TEXAS
REPUBLIC OF MEXICO
MAP LOCATION
UT.
CO.
KA.
OK.
NEW MEXICO
AZ.
TX.
MEXICO
N
SCALE IN MILES
T13S
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
T33S
R22W 21
20
19
18
17
16
15
R14W
R13W
12
11
10
9
8
7
6
5
4
3
2
R1W
R1E
2
3
R4E
4
R5E
10
25
70

SOURCE: BLM Las Cruces District Files 1982

TABLE 2-15

CORRELATION BETWEEN VEGETATION TYPES AND SITE TYPES a/

	Vegetation Types and Percent of Total Vegetation												
	1%	16%	31%	3%	1%	15%	1%	7%	1%	1%	1%	10%	1%
Site Type	Forbs	Grass	Creosote	Tarbush	Broom Dalea	Mesquite	Fourwing Saltbush	Mixed Desert Shrub	Sand Sage	Yucca	Whitethorn	Snakeweed	Juniper
Paleo-Indian		1 (1%)	2 (1%)			1 (1%)							
Archaic		3 (1%)	9 (1%)			32 (4%)	2 (1%)						
Pithouse		7 (1%)	27 (4%)		1 (1%)	37 (5%)	1 (1%)	4 (1%)			2 (1%)	3 (1%)	
Pueblo		25 (3%)	37 (5%)			139 (18%)	2 (1%)	3 (1%)					
Historic		2 (1%)	11 (1%)			5 (1%)	1 (1%)	1 (1%)		1 (1%)		1 (1%)	
Undetermined	1 (1%)	26 (3%)	128 (17%)	3 (1%)	1 (1%)	185 (24%)	3 (1%)	17 (2%)	3 (1%)	1 (1%)		29 (4%)	1 (1%)
Quarry			2 (1%)										
Petroglyphs		1 (1%)	7 (1%)			1 (1%)							
TOTAL	1 (1%)	65 (8%)	223 (29%)	3 (1%)	2 (1%)	400 (52%)	9 (1%)	25 (3%)	3 (1%)	2 (1%)	2 (1%)	33 (4%)	1 (1%)
Total Number of Sites = 769 b/													

Source: BLM Las Cruces Office Files, 1982.

Notes: a/ Percent of total vegetation is based on the entire Resource Area.

b/Site total (769) is based on the number of sites in the Resource Area (exclusive of the Elena Gallegos survey) for which vegetative data exists.

TABLE 2-16

PHYSICAL CONDITION OF CULTURAL SITES IN THE RESOURCE AREA[a]

Good	Fair	Poor	Destroyed	No Information
145	289	88	32	210

Agents of Deterioration

Erosion	Pothunting[b]	Construction	Unknown	None[c]
295	135	43	206	107

Source: BLM Las Cruces District Office Files, 1982.

Notes: a/Because much of this data was recorded before the 1970's, the conditions of many of these sites has probably changed for the worse. Since the table includes all recorded sites in the Resource Area, many sites on private land in the Rio Grande Valley have probably been destroyed since they were recorded. Sites on public land are probably less affected by construction and agricultural land clearance than those on private land; therefore, they may be in somewhat better condition except near areas of high population density.

b/Pothunting includes digging for artifacts, surface collecting, and vandalism.

c/No significant deterioration of the site at the time it was recorded.

Of the 764 prehistoric sites recorded in the Resource Area, 19 percent are in good condition, 38 percent are in fair condition, 12 percent are in poor condition, 4 percent are destroyed, and 27 percent do not have enough information to make a determination on the condition. The total number of sites does not equal the number of sites (980) recorded in the surveys because multicomponent sites were not recounted. No overall statistically valid predictions of prehistoric site location, density, and condition can be made because of the clustering of the existing surveys in two portions of the Resource Area and the small sample size.

There are 17 sites in Dona Ana, Luna, Grant, and Hidalgo Counties that are listed on the National Register of Historic Places (Federal Register, Vol. 44, No. 26, February 6, 1979; Vol. 45, No. 54, Tuesday, March 18, 1980; all subsequent volumes with a New Mexico listing). However, none of these sites are on BLM land.

A number of sites not on the National Register of Historic Places are of particular significance in the Resource Area. The Butterfield Trail bisects the area from roughly east to west. It was a major transportation corridor from the period of the Gold Rush to the 1880's when the railroad displaced it. In order to protect the immigrants and mail from Indian attacks, a major military establishment, Fort Cummings, was built in the 1860's at Cooke's Spring. It was originally of adobe construction; when it was reoccupied in the 1880's, it was a tent camp. Several hundred years earlier, a major petroglyph site was developed around the mouth of Fryingpan Canyon, a few miles west of Fort Cummings, and at Pony Hills. They are the largest sites illustrating the Jornada petroglyph style west of the Rio Grande. The site of Oldtown is one of the largest Mimbres sites known; because of its location, it may well have been a major center of trade for the Mimbres Valley.

The Aden Lava Flow is a designated research natural area (RNA). The RNA covers 4,000 acres. The area was designated because of its outstanding educational opportunities to study the interaction of flora and fauna associated with a lava flow community, paleontology, and geologic processes. The lava flow is relatively flat with some areas containing steep-walled fenesters, steep ridges, and crevices. The objectives of the RNA are to preserve an adequate sample of the lava flow ecosystem, to encourage scientists to use the area for research, and to preserve the genetic diversity of the area.

VISUAL RESOURCES

The inventory of visual resources and development of Visual Resource Management (VRM) classes were completed for Dona Ana County in 1979-80 and for Luna, Hidalgo, and Grant counties in 1981.

The VRM class assigned to an area depends on three factors:

1. the inherent quality of the scenery;

2. the visual sensitivity which expresses the volume of viewers and their attitudes toward changes in the scenery;

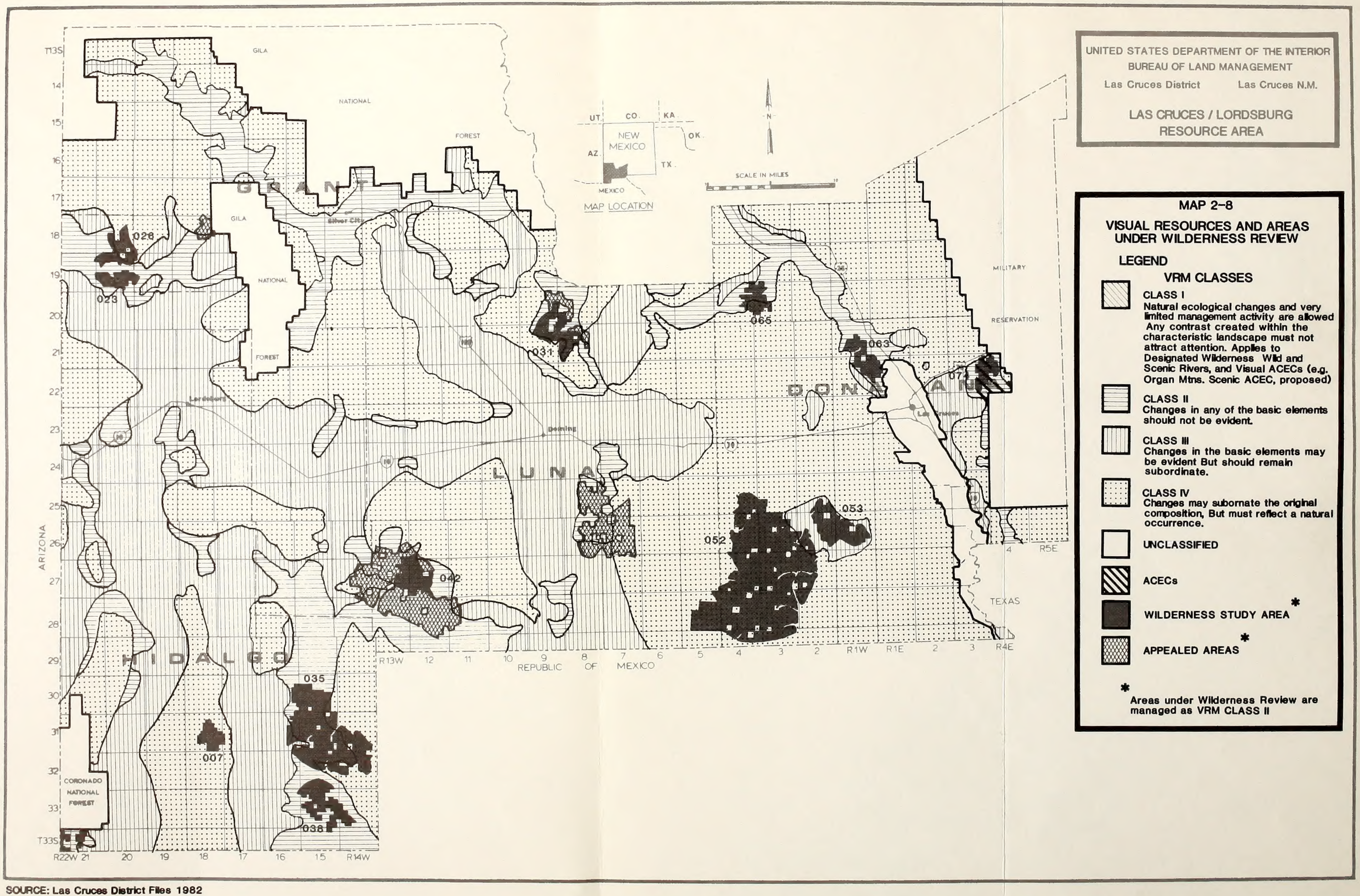
3. the distance zones from which the scenery is being viewed.

A discussion of the inventory and evaluation process is presented in Appendix I-1. Each VRM class describes a different degree of modification allowed in the basic elements of a landscape. For each class, the primary character of the landscape should be retained regardless of the degree of modification. The minimum management objectives for each VRM class are described on Map 2-8. In addition to the development of VRM classes, the VRM inventory results in the identification of potential Areas of Critical Environmental Concern (ACECs) for visual resources. Two criteria are required for an area to be considered as a potential ACEC for visual resources or scenic values: (1) the area rates high (Class A) in scenic quality and (2) the area has a rating of five or six for scarcity. Class A scenic quality ratings are assigned to areas that combine the most outstanding characteristics of each of the following seven rating factors: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications. Visual resources are generally rated for scarcity according to how rare or unique the scenic resource is within a region. However, for scenic resources that may be more common in the region, high scarcity ratings may be assigned because of distinguishing characteristics that are unusually memorable.

One potential ACEC for visual resources, the Organ Mountains Scenic Area, was identified in Dona Ana County. The Organ Mountain Scenic Area in Dona Ana County is also proposed as an ACEC. The Organ Mountains form the eastern backdrop for the city of Las Cruces, the second largest urban area in New Mexico. The mountains are one of the most unique and spectacular topographic features in the region. Characterized by a palisade of massive, jagged granite peaks with bare rock caps, the landform visually dominates the landscape within a 25 to 30 mile radius. The highest elevations of the Organs are almost a mile above the adjacent valley bottom. The jagged spires and needles of the range were presumably named for their resemblance to an enormous pipe organ. The wide diversity of vegetation in the Organ Mountains contributes to the area's unique scenic values. Three life zones, the Lower Sonoran, Upper Sonoran, and Transition Zones, are represented in the Organ Mountains. Douglas fir occurs at higher elevations on the east facing slopes near the mountain peaks. This is the southern-most area that Douglas fir is known to exist in the State of New Mexico. The Organ Mountains rate high (Class A) in scenic quality and have a rating of five for scarcity. The scenic resources of the Organ Mountains are also important in terms of people's perceptions and attitudes toward the management of that resource. As documented in the Southwestern New Mexico Socio-Economic Profile prepared by Harbridge House, Inc. in October 1978, residents of Las Cruces share the attitude that the Organ Mountains should be preserved and protected, citing them as centers of recreational activity and a source of considerable civic pride. The high visual sensitivity of the Organ Mountains is supported by the number of users. The Organ Mountains are viewed daily by a resident population in excess of 50,000 people. They are traversed by U.S. Highway 70 with an average annual daily traffic (AADT) volume of over 5,000 vehicles and paralleled by Interstate Highway 10 with an AADT volume of over 11,000 vehicles. Recreation use within designated areas exceeds 80,000 visits annually. A yet to be determined number of dispersed recreation users in the Organ Mountains further increases the visitor use figure.

Two areas in Luna County, the Florida Mountains and Cooke's Range, also met the two required criteria for a potential ACEC for visual resources. However, these two mountain ranges include large parcels of state and private lands. The land status patterns in these two areas eliminated them from further consideration as ACECs for visual resources.

Although the area does not meet the required criteria for a potential ACEC for visual resources, there are outstanding scenic values in the Gila Lower Box. It is composed of massive blocky outcrops which break into the steep-walled canyons. The canyon is over 600 feet deep



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Las Cruces District Las Cruces N.M.

LAS CRUCES / LORDSBURG
RESOURCE AREA

MAP 2–8
VISUAL RESOURCES AND AREAS UNDER WILDERNESS REVIEW

LEGEND
VRM CLASSES
CLASS I
Natural ecological changes and very limited management activity are allowed Any contrast created within the characteristic landscape must not attract attention. Applies to Designated Wilderness Wild and Scenic Rivers, and Visual ACECs (e.g. Organ Mtns. Scenic ACEC, proposed)
CLASS II
Changes in any of the basic elements should not be evident.
CLASS III
Changes in the basic elements may be evident But should remain subordinate.
CLASS IV
Changes may subornate the original composition, But must reflect a natural occurrence.
UNCLASSIFIED
ACECs
WILDERNESS STUDY AREA *
APPEALED AREAS *
* Areas under Wilderness Review are managed as VRM CLASS II
GRANT
LUNA
HIDALGO
DONA ANA
GILA NATIONAL FOREST
GILA NATIONAL FOREST
CORONADO NATIONAL FOREST
MILITARY RESERVATION
ARIZONA
TEXAS
REPUBLIC OF MEXICO
Silver City
Lordsburg
Deming
Las Cruces
UT. CO. KA.
NEW MEXICO
AZ. OK. TX.
MEXICO
MAP LOCATION
N
SCALE IN MILES
026
023
031
065
063
071
042
052
053
035
007
038
T13S
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
T33S
R22W 21
20
19
18
17
16
15
R14W
R13W
12
11
10
9
8
7
6
5
4
3
2
R1W
R1E
2
3
R4E
4
R5E

SOURCE: Las Cruces District Files 1982

in places. In the eastern half of the canyon, the predominant colors are pinks and reds. The western half is composed of a much darker black/brown rock. Water in the river is usually slow-moving and flat. Water color varies with the season, but is usually somewhat brown because of the sediment loads it carries. The Gila Lower Box has a class A (high) scenic quality rating.

VRM classes can also reflect management considerations. Each Wilderness Study Area (WSA), for example, is managed as a VRM Class II area under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (December 1979). If the area is dropped from wilderness review, it would then be managed under the existing VRM class.

Map 2-8 illustrates the locations of the proposed Organ Mountains Scenic ACEC and the VRM classes.

RECREATION

The LCLRA contains a wide variety of recreational opportunities. These opportunities occur in two categories, dispersed and developed.

Dispersed recreational opportunities are independent of recreational developments. These activities usually occur in natural or rural settings. Contact with other recreational groups are usually low on trails and away from roads. Dispersed recreation activities in the LCLRA include camping/picnicking, sightseeing, rockhounding, off-road vehicle (ORV) use, hiking, shooting, and non-game and game hunting. Game hunters pursue game birds, javelina, mountain lion, white-tailed and mule deer, and ibex. Non-game species pursued by hunters include rabbits and coyotes.

Deer hunters are spending approximately 79,560 visitor hours per year in Hidalgo, Grant, and Luna Counties. This figure is determined through the projected hunter days, percent of public land within the herd unit, and the percent of hunter pressure on public land (see Appendix J-1 for methodology).

The following areas within the Resource Area are of special interest to recreationists. In addition, many of these areas receive special management attention from the BLM. The locations of these areas are shown on Overlays 2 and 3.

The Organ Mountain Recreation Lands (OMRLs), east of Las Cruces, are a significant recreational resource in the Resource Area. The OMRLs were designated in 1971 and are managed primarily for recreation. The OMRLs provide both dispersed and developed recreation opportunities. The Aguirre Spring Campground is currently the only developed recreation site in the Resource Area. The Aguirre Spring Campground provides approximately 80,000 visits per year. The Baylor Recreation Area, Organ Mountains Recreation Area, and Needle's Eye Picnic Site are all areas within the OMRLs that have been classified for recreational purposes under the Classification and Multiple Use (C&MU) Act. The classification of these areas under the C&MU Act also segregated the areas from all forms of appropriation under the public land laws, including the general mining and mineral leasing laws. Major activities within the OMRLs are picnicking, camping, hiking, horseback riding, sightseeing, rockhounding, and rock climbing.

The Dona Ana Recreation Area, northeast of Las Cruces, was classified under the C&MU Act in 1970 for recreational purposes and segregated from all forms of appropriation under the public land laws, including the general mining and mineral leasing laws. The area is used by ORV and picnic enthusiasts. A 25-unit day use and overnight campground and picnic area has been proposed for the area (SRG MFP 1982).

The Kilbourne Hole National Natural Landmark (NNL) was designated in 1975. The Kilbourne Hole is a very large maar; a pit or depression caused by volcanic explosion in which little volcanic material except gas is emitted. Maars are uncommon geologic features, hence the NNL designation. The area receives use as a camping and picnic area. Overnight and day use primitive camping and picnic facilities are proposed for the area (SRG MFP 1982).

An area of 1,272 acres in the Franklin Mountains on the New Mexico-Texas state line, south of State Highway 404, are physically and topographically contiguous to the approximately 30,000 acre Franklin Mountains State Park in Texas. The Park receives heavy use from the population of El Paso in the form of hiking and primitive camping. Legislation creating the Park was passed in 1979 and a master plan has not been written. However, it is expected that management will emphasize primitive, dispersed recreation opportunities with limited developed sites along the periphery of the Park (Hardie 1982). An additional 2,860 acres in the Franklin Mountains extend approximately 5 miles north of State Highway 404 to the Fort Bliss Military Reservation Boundary. Recreational use of the northern part of the Franklins will probably increase as the populations of El Paso, Texas, and Alamogordo and Las Cruces, New Mexico, grow.

The Granite Gap Recreation Area was also classified in 1970 for recreational purposes under the C&MU Act and segregated from all forms of appropriation under the public land laws, including the general mining and mineral leasing laws. The area is located along U.S. Highway 80, southwest of Lordsburg, and contains many interesting rock formations. Although picnic facilities were proposed for the area in the Gila MFP (1978), development the site has not been pursued for a variety of reasons including the fact that the area provides habitat for the Gila Monster, a state-endangered species.

The Gila Lower Box, north of Lordsburg, is a unique recreational resource in the Resource Area. The combination of vegetation, wildlife, water, scenery, and cultural resources along this stretch of the Gila River provides opportunities for hiking, camping, picnicking, nature study, sightseeing, photography, bird watching, swimming, and during the spring runoff, floating the river with rafts, kayaks, or canoes. There has been a proposal to develop a recreation activity plan for the Gila Lower Box which will include consideration for access, land acquisition, facilities, cultural values protection and interpretation, and trails (Gila MFP 1978).

The Gila River Middle Box is a steep-walled deep and narrow canyon upstream from the Lower Box. During high spring flow, this canyon provides the best whitewater kayaking, canoeing, and rafting opportunities in the Resource Area.

The Heritage Conservation and Recreation Service prepared a Nationwide Rivers Inventory (National Park Service 1982) listing rivers that might be eligible for wild, scenic, or recreational river status as outlined in the Wild and Scenic Rivers Act (P.L. 90-542, October 2, 1968). A 97-mile length of the Gila River extending from the Arizona-New Mexico border to the confluence of the East and West Forks within the Gila National Forest was identified in the Nationwide Inventory. This part of the Gila River is also included in the proposed New Mexico Rivers System. The Gila Lower Box and Gila Middle Box are both located in this segment of the Gila River.

The Guadalupe Canyon was designated in 1971 as an Outstanding Natural Area (ONA) to recognize and protect bird habitat in the canyon. The area was classified for recreational purposes under the C&MU Act and segregated from all forms of appropriation under the public land laws, including the general mining and mineral leasing laws, in 1968. Birdwatchers from across the United States are attracted to the canyon despite the remote location and difficult access.

The West Potrillo Mountains in the southwest part of Dona Ana County are a north-south trending series of low volcanic cinder cones. The topography consists of undulating cones interspersed with gently-rolling to flat valleys. The maximum relief is approximately 1,000 feet. The vegetation is sparse and ranges from creosote-mesquite to desert shrub-grass types as the elevation increases. The 1975 Management Framework Plan for the Las Uvas Planning Unit recommended that a study be conducted to determine the value of 67,373 acres in the central part of the West Potrillos as a primitive area. Since considerable public interest was shown for the protection of the primitive values of the West Potrillos, the area has been withheld from energy minerals leasing to allow time to study the area for possible designation as a primitive area.

EXISTING AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)

The Federal Land Policy and Management Act (FLPMA) of 1976 mandated the BLM to identify and protect public land which contain significant natural or cultural resource values. Congress defined these "Areas of Critical Environmental Concern" as areas:

> "...within the public land where special management attention is needed to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards."

One ACEC is currently designated (see Overlay 2). The Central Peloncillo Research Natural Area (RNA) was designated a ACEC in 1980 to protect 2,468 acres of public land in an ungrazed ecotype valuable for scientific research. A cooperative agreement between BLM and the owner of adjacent private land, Dr. R. T. Scholes, ensures that the area will not be grazed by livestock, and will be used as an area for monitoring and gathering of base line information for comparison purposes. Vegetation in the ACEC is unique in that it is a "mixing zone" of the Chihuahuan and Sonoran Deserts. The Central Peloncillo RNA ACEC is characterized by pinyon-juniper woodlands on upper north facing slopes, dense oak-manzanita-juniper thickets in canyon bottoms, and desert shrub-sacahuista-midgrass types on lower slopes. In a study of the soil-vegetation patterns in the Central Peloncillo Mountains, Moir (1979) categorized the vegetative subtypes into (1) piedmont grassland; (2) chaparral savanna; (3) chaparral woodland; (4) oak savanna; (5) canyon oak woodland; and (6) pinyon-juniper woodland. Many of the plant species Moir described are not found anywhere else in New Mexico except the "bootheel" area in the southwest corner of the state.

WILDERNESS

The Federal Land Policy and Management Act (FLPMA) of 1976 mandated the BLM to examine the wilderness potential of certain areas of public land. The wilderness review provision of FLPMA, Section 603, directs the BLM to conduct an inventory to identify all roadless areas of 5,000 acres or more that have wilderness characteristics. These areas are called Wilderness Study Areas (WSAs). Once the WSAs have been identified, they will be studied through BLM's planning system to determine whether each is suitable for preservation as wilderness or is more suitable for other uses. The findings of these studies lead to recommendations, through the Secretary of the Interior and the President, to Congress. The Secretary will report his recommendations by October 21, 1991. The President will report to Congress on all areas by October 21, 1993. Only Congress has the authority to designate public land as wilderness.

BLM will manage all lands under wilderness review in a manner that maintains the area's suitability for preservation as wilderness. The BLM's interim management policy (IMP) is outlined in the Interim Management Policy and Guidelines for Lands Under Wilderness Review (December 1979).

As a result of the wilderness inventory, BLM identified 12 WSAs in the LCLRA. All of the 12 areas were designated WSAs in the New Mexico Wilderness Study Area Decisions (November 1980) and are listed in Table 2-17. The acreages shown are approximate and reflect corrections made during the wilderness study. Therefore, these acreages differ from the acreages published in the New Mexico Wilderness Study Area Decisions (November 1980).

TABLE 2-17

WILDERNESS STUDY AREAS - LAS CRUCES/LORDSBURG RESOURCE AREA

WSA Name	WSA Number	Acres
Cowboy Spring	NM-030-007	6,699
Gila Lower Box	NM-030-023	8,555
Blue Creek	NM-030-026	14,096
Cooke's Range	NM-030-031	19,608
Big Hatchet Mountains	NM-030-035	65,872
Alamo Hueco Mountains	NM-030-038	16,512
Cedar Mountains	NM-030-042	14,911
West Potrillo Mountains and Mount Riley	NM-030-052	157,185
Aden Lava Flow	NM-030-053	25,287
Robledo Mountains	NM-030-063	12,946
Las Uvas Mountains	NM-030-065	11,067
Organ Mountains	NM-030-074	7,283
TOTAL		360,021

Source: BLM Las Cruces District Office Files, 1982.

All of these WSA decisions were appealed to the Interior Board of Land Appeals (IBLA). The size, boundaries, and status of all of these WSAs are subject to change pending the outcome of the IBLA decisions.

The areas listed in the chart below are non-WSAs in the LCLRA that are under appeal to the IBLA. The BLM recommended that these inventory units or portions of units be dropped from further wilderness review in the New Mexico Wilderness Study Area Decisions (November 1980). These decisions were appealed to IBLA. These areas will continue to be managed under the IMP until all rights of appeal have been exhausted.

Unit Name	Unit Number	Acres
Redrock	NM-030-025	3,833
Cooke's Range	NM-030-031	6,215
Florida Mountains	NM-030-034	37,944
Cedar Mountains	NM-030-042	65,375

The WSAs listed in the chart below are partially or wholly within the LCLRA. They are in the area along the New Mexico-Arizona border that is jointly administered by the BLM Las Cruces District and BLM Safford District in Arizona under a cooperative agreement. These WSAs are being studied for wilderness suitability by the BLM Safford

District. The Las Cruces District is responsible for the administration of minerals in these areas.

WSA Name	WSA Number	Acreage In New Mexico	Acreage Total
Peloncillo Mountains (Doubtful Canyon)	AZ-4-60	4,128	13,032
Apache Box	AZ-4-76	937	937
Hoverrocker	AZ-4-77	22	2,791

Section 603(c) of FLPMA also mandated the BLM to examine the wilderness suitability of all primitive and natural areas which were designated prior to November 1, 1975. These areas were not identified through the BLM inventory process. They were declared WSAs by the act of Congress. Therefore, the BLM has described them as wilderness "Instant Study Areas" (ISAs).

The Guadalupe Canyon Outstanding Natural Area is the only ISA in the LCLRA. The ISA is located in the extreme southwest corner of New Mexico and is contiguous both with a WSA administered by the BLM Safford District in Arizona and to the U.S. Forest Service Roadless Area Review and Evaluation - II (RARE II) Further Planning Area 3200, Bunk Robinson Peak. The ISA's principle feature is a long, narrow canyon which extends into Mexico. Striking scenic values and unique species of flora and fauna characterize the area.

At present, joint study efforts are being conducted by the BLM Las Cruces and Safford Districts and the Coronado National Forest. Recommendations regarding the suitability or nonsuitability of the contiguous areas, including Guadalupe Canyon, will be displayed in a draft environmental impact statement (DEIS) prepared as a part of the Coronado National Forest land use planning process. The DEIS was released for public review on December 5, 1982.

Map 2-8 illustrates each of the WSAs' location. For additional information on each area, see the New Mexico Wilderness Study Area Decisions (November 1980), the Draft Environmental Assessment-Wilderness Study Areas in the Las Cruces District (proposed for release in 1983), and the Wilderness Review-Arizona (November 1980).

OTHER LAND USES

The public land managed by BLM in the LCLRA is used principally for grazing. However, a variety of other land uses also take place, including recreation (ORV use, hunting, hiking, sightseeing, and rock collecting), rights-of-way (communication sites, major pipelines for petroleum products, electric powerlines of all sizes, and roadways of all sizes), leases (Recreation and Public Purpose leases for sanitary landfills and recreation sites), mineral production (metallic, nonmetallic, and mineral materials), research (New Mexico State University and NASA), national defense, and other minor uses.

Generally, the land within the Resource Area outside of the grazing allotments is used for irrigated agriculture, rural residency, ranching, mineral development, recreation, and urban development.

Transportation

Access to the Resource Area is principally via Interstates 10 and 25; U.S. Highways 70, 80, and 180; State Roads 9, 11, 26, 28, 61, 90, 338, and 464; along with numerous county roads and ranch trails. Traffic on the interstates is very heavy with vehicles just "passing through"; local traffic is only a minor part of the total traffic count. Interstate 10 is the nation's major "snow free" southern route to the west coast. The Santa Fe and Southern Pacific railroads cross the Resource Area. Roads for railroad maintenance are located on railroad rights-of-way in some locations. Although they are not public roads, they are usually open to public use.

SOCIAL CONDITIONS

Demography

In 1980, the Resource Area had a population of 144,178 persons, as shown in Table 2-18. Two of every three inhabitants of the area lived in Dona Ana County, mostly in Las Cruces and the river corridor. The population in the Resource Area represents 11 percent of that of the state, only slightly above the 1970 ratio. The growth by county has been relatively slow with the most growth in Dona Ana and Luna Counties. Hurley and Lordsburg have lost population over the last 20 years. Virden and Columbus had the highest population growth rates of municipalities in the area between 1970 and 1980. (Harbridge House, Inc. 1978 and update 1982.)

TABLE 2-18

POPULATION COUNTS FOR THE LAS CRUCES/LORDSBURG RESOURCE AREA
BY COUNTY, 1950-1980

County	Population Counts by Census Year				Average Annual Percent Change
	1950	1960	1970	1980	1970-1980
Dona Ana	39,557	59,948	69,773	96,340	3.81
Grant	21,649	18,700	22,030	26,204	1.89
Hidalgo	5,095	4,961	4,734	6,049	2.78
Luna	8,753	9,839	11,706	15,585	3.31
LCLRA	75,054	93,448	108,243	144,178	3.32

Source: U.S. Department of Commerce, Bureau of the Census, 1950-1980.

Outside these incorporated areas, the Resource Area is sparsely populated. The number of inhabitants per square mile was 9.7 in 1980, compared with 10.7 for the state. Dona Ana County, with a 25.2

population density per square mile, is the most densely populated county in the Resource Area. Hidalgo County is the most sparsely populated county with a 1.8 population density per square mile. Luna and Grant Counties had a 5.3 and 6.6 population density per square mile, respectively. Medium level population projections (Vest 1982) for 1990 and 2000 indicate that growth for the Resource Area will continue at about the same average annual rate as during the last decade, 3.2 percent.

The racial/ethnic population of the Resource Area is shown in Table 2-19. The ranching population constitutes less than one percent of the Resource Area population.

TABLE 2-19

POPULATION COUNTS BY RACIAL AND ETHNIC GROUPS
LAS CRUCES/LORDSBURG RESOURCE AREA, 1980

	Dona Ana	Grant	Hidalgo	Luna	Total	Percent LCLRA
White Non-Spanish Origin	42,862	12,418	3,144	9,084	67,508	46.82
White Spanish Origin	32,439	9,659	2,619	4,251	48,968	33.96
Black	1,597	132	13	254	1,996	1.38
American Indian	765	124	6	78	973	0.67
Asian and Pacific Islander	594	44	39	31	708	0.49
Other	18,083	3,827	228	1,887	24,025	16.67

Source: U.S. Department of Commerce, Bureau of the Census, 1980.

For more detailed information on the demographic structure of the Resource Area see "A Social-Economic Profile (SEP) of the Border Region" (New Mexico Border Development Bureau 1979) and the "Southwestern New Mexico Social-Economic Profile" (Harbridge House, Inc. 1978) and update, available for review in the Las Cruces District Office.

Social Well-Being

Social well-being is usually defined as the quality of life in a community. It can also be called the quality of personal experience as to how well the community serves the social needs of its members. There are two dimensions of measurement, the objective conditions appropriate to the population and the population's subjective attitudes to those conditions.

Using statistical measures for the objective conditions, in general, the Resource Area can be described as being below the state average in the following characteristics: per capita income; median family income (except Grant); public health services (hospital beds, doctors, dentists, nurses); median school years completed (except Dona Ana); public school mobility rate (except Luna); divorce rates (except Grant); property crimes (except Dona Ana and Luna); and violent crimes (Harbridge House, Inc. 1978 and updated information 1982). The Resource Area is above the state average in the following characteristics: percent unemployed; percent people in poverty status (except Grant and Hidalgo); percent primary grade repeaters (except Dona Ana); public school attrition rates (except Grant and Hidalgo); and percent population receiving public service cash grants (except Hidalgo).

In 1978, Harbridge House, Inc., conducted interviews with selected residents in Dona Ana, Luna, and Sierra Counties in order to obtain specific information regarding attitudes and values (Harbridge House, Inc. 1978). It is assumed that these responses are representative of attitudes existing in Grant and Hidalgo Counties, also. Of the 99 residents selected for response, 53 indicated that they liked living in the area very much. When asked what aspects of living in the area they especially liked, ranching/rural lifestyle was listed most often and then in descending but almost equal order they mentioned the climate, the small size/neighborliness of the community, friendly people, the beauty of the area, and recreational opportunities. Few negative aspects of the area were mentioned; the most common being problems with conflicting land uses and deteriorating public services. The respondents indicated that local governments, law enforcement, public education, and health care were all better than average and recreational facilities were good to excellent. The respondents viewed less positively the ability to find employment and to earn a good income, adequacy of shopping, and sufficiency of housing. The lack of water was mentioned a few times as being a problem. Harbridge House, Inc., concluded that the unanimity of the sample in identifying favorable aspects of life in the area outweighed all local shortcomings.

Community Lifestyles and Values

The Border SEP (New Mexico Border Development Board 1979) states that:

> "According to several important economic indicators, New Mexico's border region is one of the poorest areas in the country."

and that

> "New Mexico contains vast rural areas, most of which are isolated by poor roads and primitive communications. Income distribution is uneven, with disproportionate clustering at the extreme ends of the income curve; a great deal of the state's economic activity attracts unskilled or semi-skilled low-wage labor. In addition, the tax base is substantially restricted by the existence of large federal land holdings . . .."

Among those areas which were singled out as less economically developed were substantial portions of Dona Ana, Luna, Hidalgo, and Grant

Counties. This area has long been economically dependent on agriculture production and the exploitation of the rich mineral resources. This has been augmented by ranching, lumbering, recreation, and tourism.

The social and economic patterns, customs, values, foods and language of these counties (and Chihuahua, Mexico) are a mixture of various cultures. However, the culture is not homogeneous, there is disparity in certain values and beliefs of the non-Hispanics (Whites) and the Hispanics (Harbridge House, Inc. 1978). Another disparity between residents tends to be differences in values between rural and urban populations and more specifically those between ranchers and businessmen. In general, ranchers stress the values of the land, religious faith, and family life while the businessmen stress community relationships, academic achievement, personal development, and economic development (Harbridge House, Inc. 1978).

Attitudes, Concerns, Issues

Significant differences exist in the way the public land is viewed and the way it should be used. Ranchers and farmers perceive land as a resource from which they obtain an income and often express an emotional attachment to their ranch or farm. Many of the farms and ranches have been operated by families for several generations and have become a part of an individual's identity, personal heritage, and family history. Ranchers, who were interviewed by Harbridge House, Inc., appeared to be motivated by a personal commitment to a ranching lifestyle and a "pioneer ethic." Harbridge House, Inc., concluded that the ranchers' attitude toward land, including grazing units whose ownership may be public but whose use has been the family property for several generations, differ from those of mining companies and recreational users who do not see land as the basis of a lifestyle, but as an economic or leisure-time resource to be available for the general good. Consequently, the latter more often support notions of public use management, while the former prefer that the public land be sold to ranchers, or, at least, that ranchers be left undisturbed in their present land use. However, opportunities for the rancher to be left undisturbed are diminishing as social and economic changes are occurring. Population growth and economic development are increasing competition between the uses of the land. Nearly half of the respondents in the Harbridge House, Inc. interviews identified increases in population as a change agent. The farmers, ranchers, and rural residents tended to view this change, and others, in a more negative way than did businessmen and urban residents. The rural residents feel threatened by present processes of change, whereas the urban residents, particularly the businessmen, regard past growth and expected development as beneficial in both personal terms and in terms of the community.

Mining, especially in Grant County, has been an important contributor to the occupational activities and lifestyles for about 100 years, however, rapid change is taking place with the closing of many mines. The miners also feel the public land belongs to them. They feel they have the right to explore and develop because of the grave national need for domestic minerals. The mining industry workers are generally thought of as having a highly mobile lifestyle, however, the situation in Grant County may be atypical. Mining is fairly centralized in this County, has existed for many decades, and employs many of the ranchers. Mining interests oppose any management decision which might obstruct this resource development. They associate mineral production with economic progress and improvement in living standards, quality of life, and human technology (Harbridge House, Inc. 1978). There are many independent miners who share with the ranchers the views that land is the basis of a lifestyle.

Beginning in the 1960's, there was an increased demand for recreational pursuits. This was influenced by the increase in leisure time, economic affluence, and the need for and the recognition of the social benefits of recreational experiences. The predominant outdoor recreation activities are: hunting, ORV use, rockhounding, hiking, camping, and picnicking. From the perspective of the recreationists, the public land should be managed to ensure opportunities for relief from daily stress, for greater family solidarity, and physical and mental fitness.

Generally, most of the residents in the Resource Area prefer a future environment which is similar to the present characterized by clean air, open spaces, and the primarily agricultural setting. They tend to disfavor increasing industrialization and population growth which are characteristics of a developing economy.

It is stated in the Southwestern SEP (Harbridge House, Inc. 1978) that, although there was considerable diversity between counties, their communities shared a...

> "...western way of life, which included among its components, the following: small-town living with its customs of friendliness, neighborliness, and mutual aid; a love of the great outdoors; and adherence to traditional, conservative values, including close family ties, traditional sex roles, and a strong religious life."

When Harbridge House, Inc., interviewed the key informants in the SEP area, some social and political divisions were perceived by respondents in their communities. One in 10 reported that a large number of their neighbors stood outside the mainstream of local events. The divisions which were mentioned were few but centered on retired vs. nonretired persons, Hispanic and non-Hispanic, newcomers vs. long-time residents, and low income persons vs. upper income persons. Other comments concerned relationship to the public land. Differences were distinguished between ranchers and nonranchers, environmentalists and nonenvironmentalists, as well as ORV enthusiasts, rockhounds, and other recreational users.

Attitudes toward land use and public land are strongly influenced by occupation and interest. The ratio of private to nonprivate land increases the public's dependence on decisions made by others, usually the state and Federal governments, which in turn may limit the decisions the owners can make on their private land. This can, and often does, create feelings of helplessness and frustration over not having the independence to make the decisions they deem necessary and best. With population growth there have been changes in the social structure which have created more diverse interests and more demands on the public land. The public is very interested in decisions made by the BLM as the public land is perceived as a basic resource upon which a wide range of activities depend, including economic, recreational and community lifestyles. There is also an increasing belief that use of the public land for individuals should be secondary to use for the public. These demands for reallocation of resources are threatening to the lifestyles and status of many people, particularly the ranchers.

The use of mechanical or chemical treatments to control brush is also a growing concern of the public. The two main concerns are centered upon should it be done and how BLM's past vegetation treatments were conducted.

The general attitude of the livestock growers and those in the livestock service industry is that the BLM should be doing something to control the overabundant brush on public land. They want a brush control program that will be cost effective and inexpensive so they can include their private land in conjunction with a Federal program in order to have more effective treatment results.

A considerable number of the public oppose vegetation treatments. They do not believe that it will be cost effective due to the soil and precipitation characteristics of the area. Many of them believe that it is merely a subsidization of the ranchers. Some of the ranchers do not want any vegetation treatments. They feel they do not want to risk losing what little grass they have.

Some ranchers say the mechanical method is generally so expensive, because it is labor intensive, that it would prevent them from participating in the program. The ranchers have some concern with potential soil erosion and the loss of associated grasses with this method of treatment. The public in general seems to prefer mechanical methods over chemical methods. With mechanical treatment, the perception is that there would be no herbicidal toxicological effects on human and nonvegetative organisms. However, with mechanical treatment, there is concern with soil erosion and dust pollution if there is not ample precipitation for the seeds to germinate and grow. The people involved in agricultural pursuits also prefer mechanical methods over chemical methods since there is less chance of damage to their crops. They are concerned, however, about the possibility of soil erosion, especially dust. Many people express concern that the wildlife are deprived of adequate forage and cover as mechanical treatment does remove associated grasses. There is concern that wildlife habitats and threatened or endangered plants may be destroyed. There is general agreement, however, that mechanical treatment will create unaesthetically pleasing environments for a period of time.

Public sentiment regarding chemical treatment has run high in the last few years, principally because of the publicity concerning the spraying of Agent Orange in Vietnam and the results, both real and imputed. (The chemical composition of Agent Orange has never been approved for use in the United States nor is it approved now.) A controversy exists with regard to the use of herbicides because of the suspected effects on wildlife habitat, riparian areas, threatened or endangered plant and animal species, and toxicological effects on human and nonvegetative organisms, especially from variable spray patterns and drift hazards. Those involved in agriculture have concern that drift during application and subsequent drift or dust blown from the treatment area damages highly sensitive agricultural crops.

ECONOMIC CONDITIONS

Structure of the Economy

The structure of the economy for the Resource Area was identified by an input-output (I-O) modeling process. This process depicts the supply and demand relationships of major industries of an economy in equilibrium and permits estimation of economic changes which would occur in the economy if an action were implemented. The I-O modeling process aggregates Dona Ana, Grant, Hidalgo, and Luna Counties into the Resource Area Regional Economy. The data on income and employment that are derived from the I-O tables should be considered as approximations rather than actual figures. (See Appendix K-1 for methodology used for the I-O Model and Technical Report X for further information.)

In 1980, construction, retail trade, and the natural resource industries (such as other livestock, other agriculture, and copper mining) formed the basis of most of the Resource Area economy (see Table 2-20 for total dollar output). Construction was the largest industry with an annual output of $139.1 million (14 percent of total dollar output), followed by other livestock with $109.2 million (11 percent of total dollar output), other agriculture with $102.8 million (10 percent of total dollar output), other retail trade with $99.2 million (10 percent of total dollar output), and copper mining with $92.6 million (9.4 percent of total dollar output). The range livestock industry contributed $3.6 million of annual output to the Resource Area (less than 1 percent of total dollar output).

Multipliers

Income multipliers are useful for estimating the change one economic sector of the economy would have on the total economy. For example, an income multiplier of 1.6185 for the range livestock industry indicates that a $1.00 change in the wages, salaries, and other income of the livestock industry would result in a $1.62 change in the wages, salaries, and other income of the Resource Area as a whole. This is a result of a $1.00 change in the wages and salaries for producing livestock products and an $.62 change induced in the remainder of the economy as the money is spent and respent within the Resource Area. Table 2-20 indicates that the income multiplier for the primary metals industry has the highest estimated multiplier of 5.6906 followed by other livestock industry with 3.0677, other agricultural with 2.3447, food and kindred products with 2.0652, and range livestock with a multiplier of 1.6185.

TABLE 2-20

ESTIMATED TOTAL DOLLAR OUTPUT FOR 34 INDUSTRIES 1980

Economic Industries	Dollar Output	Type II Multiplier[a]
1. Range Livestock[b]	$ 3,680,475	1.6185
2. Other Livestock	109,271,526	3.0677
3. Other Agriculture	102,819,001	2.3447
4. Copper Mining	92,666,720	1.4444
5. Other Non-Ferrous Metal Mining	2,930,471	1.5105
6. Other Metal Mining	2,765,882	1.8304
7. Crude Petroleum and Natural Gas[c]	1,000	1.5807
8. Other Mining	5,062,488	1.5363
9. Construction	139,162,332	1.5097
10. Ordnance	5,014,607	1.3380
11. Food and Kindred Products	27,239,484	2.0652
12. Apparel	34,251,436	1.5843
13. Wood Products and Lumber	1,863,289	1.5333
14. Printing and Publishing	7,866,815	1.4630
15. Chemicals	4,654,814	1.7117
16. Leather and Leather Products	65,431	1.3737
17. Stone, Clay, and Glass Products	13,370,954	1.7653
18. Primary Metals	23,694,444	5.6906
19. Fabricated Metal Products	1,093,589	1.4283
20. Machinery Except Electrical	2,367,020	1.3800
21. Electrical Equipment	686,319	1.3958
22. Transportation Equipment	437,436	1.5336
23. Miscellaneous Manufacturing	669,824	1.4413
24. Transportation	28,247,063	1.4951
25. Communications	21,566,216	1.4122
26. Utilities	34,678,929	1.8170
27. Wholesale Trade	46,641,136	1.4232
28. Eating and Drinking Places	21,356,473	1.5346
29. Other Retail Trade	99,211,768	1.3654
30. Finance, Insurance, and Real Estate	67,489,718	1.6902
31. Lodging Places	10,254,508	1.6143
32. Other Services	70,868,386	1.4490
33. Geothermal Development[c]	1,000	1.4648
34. BLM Rangeland Development Projects[d]	2,464,117	1.2366
TOTAL	$984,414,671	

Source: BLM Las Cruces/Lordsburg Input-Output Model, 1982.

Notes: a/Type II Multiplier is the ratio of the total direct, indirect, and induced change to the direct income change. It is the amount of total change due to $1.00 increase of total outputs in the household sector of final demand.

b/Dollar output for this sector is for those ranch operations that are dependent on BLM permits for their operation.

c/Items 7 and 33 were used as artificial industries with minimal dollar amounts. There is currently no production in Item 7 while Item 33 has minimal production. These industries were included to assess the economic significance for analyzing the alternatives in Chapter 3.

d/The dollar output for Item 34 is an artificial figure and does not represent economic activity for that industry nor does it interact with the other industries. It was necessary to include this data in the development of the transactions table to allow for analysis of BLM rangeland development projects in Chapter 3.

The most important economic change in the Resource Area is the recent decline in the copper industry in Grant County. The copper mines in the Silver City area laid off in excess of 2,000 employees in June 1982. The unemployment rate for Grant County in June 1982 was 39.9 percent. It is estimated those laid off may leave the area for employment opportunities elsewhere, thus relieving infrastructural pressures (University of New Mexico 1982).

Employment

Employment is estimated at 46,100 for 1980 (Bureau of Business and Economic Research 1982) with 30,567 in the non-government industries (of which 4,500 or 9.7 percent of total are employed in the agricultural industries) (see Table 2-21) and 15,500 in the government industry. In 1980, the unemployment rates for Dona Ana, Grant, Hidalgo, and Luna Counties were 8.0 percent, 7.1 percent, 4.3 percent, and 10.8 percent, respectively. The unemployment rate for the State of New Mexico for 1980 was 7.4 percent (University of New Mexico 1982). Unemployment rates in Dona Ana and Luna Counties exceeded the state average for 1980.

TABLE 2-21

ESTIMATED INCOME AND EMPLOYMENT FOR THE LAS CRUCES/LORDSBURG RESOURCE AREA, 1980

	Economic Industries	Income	Employment
1.	Range Livestock[a/]	$ 1,096,000	206
2.	Other Livestock	5,955,000	2,076
3.	Other Agriculture	7,783,000	2,262
4.	Copper Mining	25,490,000	2,595
5.	Other Non-Ferrous Metal Mining	1,156,000	97
6.	Other Metal Mining	739,600	44
7.	Crude Petroleum and Natural Gas[b/]	325	0
8.	Other Mining	1,406,000	101
9.	Construction	50,890,000	2,644
10.	Ordnance	2,905,000	191
11.	Food and Kindred Products	3,764,000	436
12.	Apparel	10,670,000	993
13.	Wood Products and Lumber	416,400	45
14.	Printing and Publishing	3,245,000	283
15.	Chemicals	1,151,000	56
16.	Leather and Leather Products	24,800	3
17.	Stone, Clay, and Glass Products	3,638,000	254
18.	Primary Metals	1,436,000	95
19.	Fabricated Metal Products	342,600	29
20.	Machinery Except Electrical	991,300	92
21.	Electrical Equipment	294,000	24
22.	Transportation Equipment	101,000	8
23.	Miscellaneous Manufacturing	212,500	21
24.	Transportation	12,150,000	1,045
25.	Communications	8,305,000	561
26.	Utilities	5,472,000	451
27.	Wholesale Trade	19,270,000	1,586
28.	Eating and Drinking Places	6,877,000	1,837
29.	Other Retail Trade	43,260,000	6,647
30.	Finance, Insurance, and Real Estate	19,580,000	1,620
31.	Lodging Places	3,625,000	749
32.	Other Services	30,540,000	3,472
33.	Geothermal Development[b/]	376	0
34.	BLM Rangeland Development Projects[c/]	1,375,000	44
	TOTAL	274,161,901	30,567

Source: BLM Las Cruces/Lordsburg Input-Output Model, 1982.

Notes: a/Total direct income is for those ranch operations that are dependent on BLM permits for their operation.

b/Items 7 and 33 were used as artificial industries with minimal dollar amounts. There is currently no production in Item 7 while Item 33 has minimal production. These industries were included to assess the economic significance for analyzing the alternatives in Chapter 3.

c/The dollar output for Item 34 is an artificial figure and does not represent economic activity for that industry nor does it interact with the other industries. It was necessary to include this data in the development of the transactions table to allow for analysis of BLM rangeland development projects in Chapter 3.

Income

Total direct income generated in the Resource Area was estimated at $274 million, with $1 million (.39 percent of the total) attributable to the range livestock industry and $5.9 million (2.2 percent) to the other livestock industry (see Table 2-21). Per capita personal income in 1980 for the Resource Area was $6,686, compared to $7,878 for the state, indicating the Resource Area is below the state average in per capita income (see Table 2-22). As indicated in Table 2-23, the per capita income for New Mexico is low when compared to other states in the southwest region (except Utah) and the United States.

Characteristics of the Ranching Population

There are 262 BLM allotments in the 3-County Area that are used by 188 livestock operators in connection with their ranching operations. Approximately 165 ranch operators are headquartered within the 3-County Area or within commmuting distance of their allotments. Twenty-three had out of state mailing addresses. Approximately 167 BLM allotments with 95 associated operators were used to calculate the ranch budgets for the 3-County Area. The remaining 95 BLM allotments that were not used to calculate the ranch budgets did not have sufficient information in their case files to determine if their total operation was identified. Ranching operations that use BLM land for this study were classified into four categories: Subsistence Size Operation, 1-69 Animal Units (AUs), 27 operators; Small Size Operation, 70-199 AUs, 25 operators; Medium Size Operation, 200-499 AUs, 27 operators; and Large Size Operation, 500+ AUs, 16 operators. Approximately 72 percent of these ranchers depend on public land for more than 50 percent of their operation. Their dependency on public land for grazing averages 59.7 percent. The dependency for the various categories using preference are as follows: Subsistence operators, 65 percent; Small operators, 61 percent; Medium operators, 67 percent; and Large operators, 57 percent. (See Appendix K-2 for methodology used for developing Ranch Budgets for the 3-County Area.)

The information used to develop the ranch budgets was obtained from the New Mexico State University publication, "Organization Cost and Returns of Typical Cattle Ranches in Southwestern New Mexico" (Gray 1979), and from BLM operator files. The 1979 budgets from New Mexico State University were adjusted to 1980 prices, and further adjusted to account for the difference in herd sizes. The subsistence size operation was calculated by comparing the subsistence operation used in the West Socorro Grazing Rangeland Management Program EIS (1982) to NMSU's small operation and deriving a subsistence category for this 3-County Area. Detailed calculations for this category, as well as the others, are contained in Technical Report X. It should be noted that although each individual ranch has its own characteristics and may vary significantly from other ranches, it is felt that the "typical" ranches used in this analysis adequately represent the majority of ranches in their appropriate category.

TABLE 2-22

TOTAL PERSONAL INCOME AND PER CAPITA INCOME BY COUNTY, 1980

County	Total Personal Income (millions of dollars)	Per Capita Personal Income
Dona Ana	$ 611	$6,328
Grant	196	7,477
Hidalgo	48	7,848
Luna	109	6,985
Resource Area[a/]	964	6,686
State	10,266	7,878

Source: a/Per capita income calculated by BLM staff based on information from U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, and Bureau of Economic Analysis, Survey of Current Business, Volume 62, Number 4, April 1982.

TABLE 2-23

PER CAPITA PERSONAL INCOME, SELECTED WESTERN STATES, 1980

State	Per Capita Personal Income (per year)
Wyoming	$10,875
Colorado	10,033
Texas	9,528
Arizona	8,814
Oklahoma	9,066
Idaho	8,176
Montana	8,652
New Mexico	7,878
Utah	7,681
Southwest Region	9,270
United States	9,511

Source: University of New Mexico, 1982.

In 1980, all ranch operations in the 3-County Area had an estimated $9.9 million in livestock sales (see Table 2-24). Total receipts amounted to $7.8 million after allowance was made for non-cash receipts and livestock perquisites. Net income for the 3-County Area was $2.9 million. The individual budgets indicate that the subsistence size operation was the only operation that showed a negative return to the operation. Despite poor financial returns from ranching as indicated in Table 2-24, ranchers and members of their families choose to continue their ranching lifestyle. (See Appendix K-3 for individual estimated costs and returns for representative ranch operations.)

The ranchers have no legal property rights to grazing preferences on public land since the land is owned by the public, but the preferences do have a defacto market value. This value is a result of the fact that ranchers have historically been deriving benefits greater than the grazing fees paid to the public for the use of public land (Nielson and Workman 1971). In the Resource Area, for 1980, public land allotments had a value of about $100 per Animal Unit Month (AUM) (Ratliff 1982). The BLM grazing permit value of the 251,497 AUMs of active public land preference on the 167 allotments is over $25 million. The value is currently being affected by BLM's process of adjusting fees to market value as required by law.

TABLE 2-24

ESTIMATED COSTS AND RETURNS
FOR REPRESENTATIVE RANCH OPERATIONS IN THE 3-COUNTY AREA, 1980[a/]

	Subsistence	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Livestock Operators	27	25	27	16	95
	Budget Items Per Ranch				Budget Items All Ranches
Livestock Sales	$11,296.80	$32,914.29	$78,959.58	$420,684.37	$9,990,729.43
Non-Cash Receipts	-1,630.00	-7,745.00	-17,499.00	-94,503.00	-2,222,156.00
Livestock Perquisites	-0-	-0-	788.88	1,449.90	44,498.16
Total Receipts	9,666.80	25,169.29	62,249.46	327,631.27	7,813,071.59
Cash Costs	7,974.88	15,932.28	33,732.81	140,076.30	3,765,635.43
Depreciation	4,146.58	6,958.68	14,577.86	36,941.34	1,270,588.32
Net Income	-2,454.66	2,278.33	13,938.79	161,986.53	2,958,814.24

Source: BLM Las Cruces District Office Files, 1982.

Note: a/Sizes of ranches are as follows:

Subsistence Size 1-69 AUs, Average 44 AUs
Small Commercial Size 70-199 AUs, Average 124 AUs
Medium Commercial Size 200-499 AUs, Average 277 AUs
Large Commercial Size 500+ AUs, Average 1,272 AUs

Characteristics of the Oil and Gas and Geothermal Industries

In the LCLRA, there are 2,520 oil and gas leases. The primary holders of these leases are major and independent oil companies. Exploration for oil and gas is occurring throughout the Resource Area. Seismic prospecting is a popular geophysical exploration method. Exploration is normally done by independent geophysical exploration companies who work under contract to the oil companies.

The average seismic crew consists of 30 employees. Approximately 10 employees are employed from the local population. The average monthly income per employee is approximately $1,600. In addition to the salary paid, a living expense of approximately $600 per month is paid to each employee. The average monthly expenditures amount to approximately $80,000 plus wages and living expenses paid. Taking this into account, the total monthly expenditures for exploration are approximately $145,000 (Jennings 1982).

There are currently 142 geothermal leases in the Resource Area. Geothermal exploration has occurred in the Radium Springs Known Geothermal Resource Area (KGRA), the Kilbourne Hole KGRA, and the Lightning Dock KGRA. The Lightning Dock KGRA contains the only developed and producing well in the Resource Area. The energy is used for space heating of greenhouses on the developed site.

There is currently no oil and gas production in the Resource Area, therefore, no revenues from production have been received. Approximately $33 million of annual revenues from existing oil and gas and geothermal leases, which 50 percent goes to the State of New Mexico, are generated in the Resource Area. The state then distributes these revenues to county governments.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter identifies and evaluates impacts to the human and natural environment which would result from implementation of the Proposed Action (PA) or the alternatives of No Action (NA), Maximization (MAX) of Energy Minerals Leasing and Livestock Forage Production, Enhancement of Other Resource Values (EORV), and Elimination of Livestock Grazing (ELG). None of the alternatives would have significant impacts on climate or topography. For this reason, they are not included in the following discussion.

The cause of an impact is tied to a component of the PA and alternatives as identified in Chapter 1. The effect of the impact is tied to a component of the environment described in Chapter 2. The impacts discussed in this chapter were assessed on the basis of the description of the PA and alternatives presented in Chapter 1. This assessment took into account the design features and Federally required measures to minimize environmental impacts. Because of the design features included in Chapter 1 as standard operating procedures, and because of the BLM's commitment to implementing these design features, the impacts assessed in this chapter are considered to be unavoidable. Impacts on proposed special designation areas would occur only if they are designated under the Proposed Action. They are not proposed for designation under any of the other alternatives, therefore the impacts would be the same as the existing situation.

There was no detailed study as to which alternative would be the most efficient in conserving energy and only general observations are possible. Although all alternatives would require the expenditure of energy, the MAX Alternative would require the most followed by the EORV, PA, NA, and ELG Alternatives. Energy use for the PA and alternatives will not be evaluated further because of the lack of reliable information, however, there is a substantial amount of fossil fuel and electrical power expended in all phases of oil and gas operations. The cost effectiveness (including energy use) of discrete actions would be analyzed in environmental assessments prepared before such actions are implemented.

There would be optimum achievement of resource potentials in the long-term under the PA. In addition, the PA would be more balanced in achieving the objectives of multiple resource management that would, in the long-term, meet the demand for energy minerals leasing, livestock forage production, wildlife, and other resource values, both renewable and depletable.

The description of the analysis of impacts follows in order of diminishing consequence except for Social and Economic Conditions. These impacts are discussed last, enabling a summation of the impacts of all the natural resources on the human resource. The analysis of impacts is presented by resource, by issue, and by alternative. A brief summary is provided only at the end of sections containing complex or lengthy discussions of impacts.

Generally, if impacts are not discussed under the PA or other alternatives, the analysis either determined that impacts would not occur or that it would be insignificant. If impacts are discussed under the PA but not discussed under other alternatives, or if an alternative is omitted, it is assumed that the impacts would be the same as the PA. For the Energy Minerals issue, this would apply to vegetation, soils, geology and mineral resources, livestock grazing, air quality, visual resources, the existing area of critical environmental concern, wilderness, social conditions, and economic conditions. For the Rangeland Management issue, this would apply to air quality, visual resources, the existing area of critical environmental concern, wilderness, and social conditions.

Several basic assumptions have been made by BLM specialists in assessing the impacts on various environmental elements.

1. The BLM would have the funds and manpower to implement the proposal or any alternative selected.

2. For the Energy Minerals issue, short-term impacts are those which occur from 1980 to 1994. Long-term impacts are those which occur between 1980 and 2010. For the Rangeland Management issue, short-term impacts are those which would occur within 9 years (1985-1994) after implementation. Long-term impacts are those that would still exist by the year 2010.

3. Impacts resulting from oil and gas and geothermal operations are based on the effects of geophysical exploration occurring throughout the Resource Area. However, the impacts related to drilling and production are assumed to occur only in those areas classified as prospectively valuable for oil and gas and geothermal resources by the Minerals Management Service (MMS).

Grazing impacts are described according to their effect on the different range sites. Environmental impacts from new rangeland developments and the continued use of existing ones are described in terms that apply for the 3-County Area.

4. Scientific knowledge is not presently available to assess long-term impacts to the fullest extent. The techniques available for predicting impacts are not precise, but rather provide an indication of the type and general magnitude of expected changes. Although impacts are stated in quantitative terms where possible, the numbers given should be taken as an indication of approximate, not absolute, amounts of change.

5. BLM would verify the level of impacts and monitor and evaluate grazing management treatments prior to and after they are implemented so the necessary adjustments in those treatments not meeting

multiple use objectives can be made. Monitoring of key forage species and wildlife population trends would be done annually on Category I allotments. Allotments proposed for Categories M and C would be inspected periodically to determine if the principal objectives are being met.

6. The quantity and quality of forage allocated to big game would be sufficient.

7. Because information concerning actual livestock use has not been collected, an exact amount is not known. Estimates by BLM specialists are that actual use is approximately equal to the 5-year average licensed use (1977-1981), although a few operations may vary.

8. Existing rangeland developments will be maintained in a serviceable condition except as described under the ELG Alternative.

9. Based on historical records, BLM vegetation specialists assume that most of the Resource Area's existing creosote and mesquite are a result of their invasion onto rangelands which had previously been dominated by grass.

10. Herbicides for brush control would be those which have been approved for use by the appropriate Federal and state agencies so that no program delay would occur.

11. The public opinions, attitudes, and concerns which were expressed in the Southwestern New Mexico Social-Economic Profile (1978), the Social-Economic Profile of the Border Region (1979), and the Socio-Economic Analysis of Proposed Grazing Management Programs in the Southern Rio Grande Planning Area of New Mexico (1981) are still representative of the residents of the Resource Area.

12. Due to the difficulty of predicting future livestock market conditions, the economic assessment was based on the assumption that current livestock market conditions would prevail.

13. The economic assessment assumes that capital values of grazing permits (per animal unit [AU]) would not change.

14. The ranch budgets constructed for this assessment constitute a composite economic model which describes "typical ranches" in the 3-County Area and are not the budgets of any particular ranches.

15. The ranch budgets used for this assessment constitute an economic model of ranches as profit maximizing enterprises and cannot completely describe any behavior that is influenced by noneconomic factors. In this regard, a standard allowance was made for depreciation of ranch equipment and improvement, although many ranch operators do not make full provision for such costs. Ranchers operating within the 3-County Area may have fully depreciated their capital investment, therefore, the allowance for capital depreciation may tend to overstate costs and underestimate profits.

16. The ranch budgets used for this assessment are based on the total herd sizes of affected ranch operators, rather than simply on the number of AUs directly dependent on public land. In order to assess the impacts of the PA and alternatives on ranches in the 3-County Area, the analysis was based on adjustments in levels of grazing on BLM lands only.

17. The assessment of economic impacts are based on the assumption that neither the PA nor any of the alternatives would result in any change in the calf crop percentage (number of calves weaned per hundred cows) or in the average weights of animals marketed.

18. It is assumed that those livestock operations that have Section 15 permits only did not represent the total operation; therefore, when calculating the various size categories, these permits were not included in the totals.

ASSESSMENT OF IMPACTS

Vegetation

Energy Minerals

Proposed Action (PA)

In the short-term under the PA, oil and gas and geothermal activities (including exploration drilling, access roads, geophysical exploration, and shallow temperature gradient holes) would disturb or destroy vegetation on 14,638 acres. Since energy minerals activities are not concentrated in any particular area and the acres affected are minimal, few range sites and associated vegetative subtypes would incur significant vegetation loss and soils compaction.

In the long-term, impacts would be insignificant for the same reasons as in the short-term. Oil and gas and geothermal activities (including geophysical exploration, exploration drilling, access roads, powerlines with related facilities, shallow temperature gradient holes and a greenhouse) on 32,692 acres would cause an insignificant loss of vegetation.

Threatened or endangered plant species and their habitat would be impacted by geophysical activities but not significantly. Areas where threatened or endangered plant species occur would be identified and avoided.

Rangeland Management

Impacts from livestock grazing resulting from the PA and other alternatives can be divided into two categories. Short-term impacts to the vegetative resource analyzed in the first 9 years would result from rangeland developments and vegetation treatments. Vegetation would be disturbed or destroyed during these activities. Long-term impacts analyzed through 2010 would occur where the vegetative resource is replaced or changed by these developments and treatments. A summary of acre changes due to rangeland developments, vegetation treatments, and grazing management treatments is shown by ecological condition and forage value class for each alternative in Table 3-1.

The impacts resulting from different grazing intensities outlined in the PA and other alternatives would not be noticeable on many sites. Any changes resulting from livestock management alone would be gradual, and on areas dominated by brush species, no improvement would be seen (Herbel 1982; Beck 1982). Influences from other factors, especially variations in climatic conditions, would affect the rate and degree of change.

TABLE 3-1

SUMMARY OF TOTAL PROJECTED PUBLIC LAND ACRE CHANGES BY ECOLOGICAL CONDITION AND FORAGE VALUE CLASS BY ALTERNATIVE[a/]

		Acres by Alternative				
	Present	PA	NA	MAX	EORV	ELG
Ecological Condition						
Excellent	1,893	18,822	0	18,822	27,518	36,213
Good	91,082	197,712	74,371	350,939	318,457	439,201
Fair	825,651	929,142	672,212	811,971	867,112	805,085
Poor	512,876	285,824	684,917	249,768	218,413	151,001
Forage Value						
Good	223,460	347,019	214,186	474,015	474,433	585,439
Fair	512,381	581,155	346,346	490,215	494,107	415,749
Poor	695,661	503,328	870,970	467,272	462,962	430,314

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Note: a/Acres reflect only the areas transected during the 1981-1982 inventory.

Proposed Action (PA)

Under the PA, small amounts of vegetation would be disturbed or destroyed at the sites of the proposed rangeland developments. Acres of vegetation disturbed or destroyed by rangeland developments are shown in Appendix F-4. Vegetation would be impacted on 344 acres in the short-term and 71 acres in the long-term in the 3-County Area. The amount of vegetative disturbance occurring during construction would depend on the methods used (e.g., flexible pipe used on pipelines ripped in would cause less disturbance than trenching used in rigid pipe placement). Grazing pressure would increase around proposed new waters and in a few instances, adjacent to new fences. Impacts resulting from the additional use would be offset by decreased pressure around existing waters and improved livestock distribution.

Under the PA, forage consumption in the short-term would not change. Monitoring studies would determine a balance between forage produced and utilized on each allotment. Proper use for each species and relative species abundance also would be analyzed. These monitoring studies would indicate where adjustments would be needed to arrive at a stocking rate consistent with improving the vegetative resource. Most grazing studies in the southwest show a need for a change in management, along with proper stocking rates, in order to obtain effective results in rangeland improvement (Cable and Martin 1964; Paulsen and Ares 1962; Canfield 1939). Specialized grazing systems have increased herbage production an average of 13 percent over continuous grazing while reductions in livestock utilization from heavy (60 to 80 percent) to moderate (40 to 60 percent) have increased production 35 percent (VanPoollen and Lacey 1979).

The long-term impact under this alternative would be an increase in production and cover of desirable and intermediate forage species preferred by grazing animals. Proper management, which provides for rest during critical periods of plant growth, could lead to an increase in plant species numbers. Reduced grazing pressure would increase plant vigor, increasing seed production and revegetation by seedlings, rhizomes, and stolons. If these desirable and intermediate plants are the climax species, they would out-compete the lower value species and reinvade the site (Stoddart et al. 1975). The analysis of data from the vegetation inventory indicates that the poor or fair ecological condition class is not relative to total production from all species, percent vegetative ground cover, or litter. However, this data does indicate a larger percentage of desirable and intermediate forage species in the higher condition class.

Permitted grazing use would be based on utilization patterns and trend studies, which is part of the monitoring procedure on Category I grazing allotments. Adjustments needed to bring stocking rates in line with grazing capacities would reduce pressure on desirable and intermediate forage species on overstocked allotments. Plant reproduction and vigor would increase as a result of reduced stocking rates and rest from grazing during certain critical periods. Ground cover and forage species production would also increase from these changes.

Under the PA, short-term changes in each ecological condition class by range site would not be significant. Long-term changes in each ecological condition class by range site as a result of grazing management treatments, rangeland developments and 51,888 acres of vegetation treatments are shown in Table 3-2. Ecological condition class ratings would be expected to increase by 10 points on allotments under the Category I grazing management scheme (see Appendix F-2). Forage value class would change proportionately. Projections for changes in the number of acres in ecological condition or forage value class are based on the amount of potential for improvement that each individual site write-up area (SWA) possesses (see Appendix B-6 for methodology). Ground cover projections by percent for each alternative as compared to the present situation on each range site are shown in Table 3-3. Ground cover would increase due to reduced grazing pressure

TABLE 3-2

PROJECTED PUBLIC LAND ACRES BY RANGE SITE FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a/]

(PROPOSED ACTION)

	Ecological Condition (acres)				Forage Value (acres)		
Range Site	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly		52,220	452,064	18,884	64,131	117,843	341,194
Deep Sand			123	8,490		2,848	5,765
Sandy		120	48,016	71,392	10,173	49,487	59,868
Loamy		13,029	79,683	23,297	32,152	62,833	21,024
Draw	18,822	23,466	8,939	2,998	4,068	43,934	6,223
Bottomland		1,885	1,574	4,814	1,081	6,823	369
Limy			3,524	1,701		3,784	1,441
Limestone Hills			5,185	2,917	1,611	6,491	
Clayey		36,388	16,855	14,397	19,848	14,735	33,057
Gravelly Sand		41	1,396	2,083	564	2,030	926
Igneous Hills		57,427	240,028	51,110	175,172	173,393	
Salty Bottomland		897	138			1,035	
Gravelly Loam			10,740	22,952	9,873	12,260	11,559
Salt Flats		7,240	16,872	30,143	13,577	19,922	20,756
Malpais			9,665	8,517		18,182	
Subtotal	18,822	192,713	894,802	263,695	332,250	535,600	502,182
Western Plateau MLRA 36							
Gravelly				640		640	
Hills		1,439	26,247	140	3,757	24,069	
Loamy			5,100	536	5,100		536
Breaks		3,560	1,989	20,205	4,908	20,846	
Bottomland				610			610
Malpais			1,004		1,004		
Subtotal		4,999	34,340	22,131	14,769	45,555	1,146
TOTAL	18,822	197,712	929,142	285,826	347,019	581,155	503,328

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Note: a/Acres reflect only the areas transected during the 1981-1982 inventory.

TABLE 3-3

VEGETATIVE GROUND COVER AND VEGETATION TREATMENTS BY RANGE SITE FOR EACH ALTERNATIVE

	Percent Ground Cover[a]							Acres Treated Under the MAX[b]	
Range Site	Existing	PA	NA	MAX	EORV	ELG	Acres Treated Under the PA	3-County Area	Dona Ana County
Southern Desert MLRA 42									
Gravelly	12	11	13	10	11	10	39,472	436,290	
Deep Sand	8	8	8	13	8	9		4,322	15,292
Sandy	12	14	11	15	15	15	9,618	39,169	345,928[c]
Loamy	16	17	16	17	17	17	457	15,790	690
Draw	26	30	25	30	32	35			
Bottomland	21	22	20	22	22	22			
Limy	12	15	12	15	16	17	2,341	2,670	
Limestone Hills	19	24	18	24	25	26			
Clayey	17	15	18	15	15	15		11,017	
Gravelly Sand	10	11	10	11	11	12			
Igneous Hills	19	20	18	20	21	21			317
Salty Bottomland	25	25	39	25	25	25			
Gravelly Loam	13	13	16	13	15	17		7,540	
Salt Flats	13	13	13	13	13	13			
Malpais	9	19	8	19	21	24			1,972
TOTAL							51,888	516,798	364,199
Western Plateau MLRA 36									
Gravelly	7	7	7	7	12	17			
Hills	12	14	12	14	16	18			
Loamy	16	16	19	16	16	17			
Breaks	16	16	17	16	17	18			
Bottomland	7	7	7	7	7	7			
Malpais	13	13	13	13	18	22			
Average Percent Ground Cover by Alternative	14	16	15	16	17	18			

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Notes: a/Weighted averages were determined from data in Appendix B-8.

b/Total acres to be treated in the Resource Area under the MAX Alternative are 880,997.

c/These acres include 10,496 acres in the shallow sandy range site not present in the 3-County Area.

under the PA. Desirable and intermediate grass and forb species would compete with undesirable species, increasing composition and ground cover in the long-term. Due to 3 previous years of below average rainfall, vegetative production in 1981 in the 3-County Area was very low (see Chapter 2, Table 2-3). As a result, analyses were not done on vegetation production.

Under the PA, 9,609 acres of mesquite and 42,279 acres of creosote would be treated with chemical herbicides to reduce the competition for available moisture. These treatments would raise the existing ecological condition one class in the long-term after treatment. Range sites proposed for treatments are gravelly, sandy, loamy, and limy. These acres by range site are shown in Table 3-3.

Five herbicides are proposed for use in controlling creosote and mesquite. Impacts of these treatments under the PA would be Resource Area-wide. Chemically treated acres discussed in the PA are for the 3-County Area. Tebuthiuron (Graslan) is a pelletized herbicide used on both creosote and mesquite. Picloram, Dicamba, 2,4,5-T, and Dowco 290 are foliar herbicides used on mesquite. Appendix B-1 contains guidelines for use and restrictions of applications for the herbicides except for Dowco 290 which is not labeled at the present time. Technical Report VI contains additional information on some of the herbicides mentioned.

Short-term impacts would occur within 1 to 3 years following application of chemicals. Pelletized treatments would be a gradual kill over this 3-year period. Foliar spray effects would be more immediate, usually killing plants by the second year and in the case of 2,4,5-T, a second application would be required. The average percent kill with chemical treatments would be 40-60 percent when used as recommended. Foliar sprays are absorbed from leaf surfaces or cuticles and transported to actively growing plant parts. Herbicide movement is favored by good soil moisture and growing conditions. Granular herbicides are leached into the soil to the plant's rooting zone following rainfall and are absorbed by the plant's root system.

Tebuthiuron would be used primarily on creosote, where it has proven effective at low rates of application. Higher rates of application would be effective on mesquite. Forb and grass growth can be reduced or damaged by Tebuthiuron when it is applied during active growth at greater than 3/4 pounds active ingredient per acre (AI/Ac) (Baur 1978). Injury can be avoided when applications are done during the winter months causing no damage to forbs and grasses (Herbel 1982). Tebuthiuron's photosensitivity breakdown time is being further studied so granules can be applied during any season.

Generally, 2,4,5-T affects a wide array of herbaceous broadleaf plants but does not affect grasses. It is not as detrimental to broadleaf plants as other phenoxy herbicides. The control of herbaceous plants is increased with ammonium salts (Picloram), benzoic acids (Dicamba), and substituted ureas (Tebuthiuron) (Sosebee and Dahl 1979). Brock et al. (1970) found that neither Dicamba nor Picloram sprayed at 0.5 pounds AI/Ac reduced grass seedlings. Rates of 1 pound AI/Ac reduced the number of grass seedlings, but not significantly. All herbicide rates of either Dicamba or Picloram substantially reduced forb production (Sosebee and Dahl 1979).

Dowco 290 induces auxin-type responses in growing plants. When used in combination with phenoxy herbicides it has shown to be very effective in controlling phenoxy tolerant weeds. This herbicide does not usually affect grasses.

Herbicide tolerance by grasses generally increases with stages of plant growth, but grasses differentially respond to the type and rate of herbicide used (Halifax and Scifres 1972; Scifres and Halifax 1972). Half shrubs and woody plants are more susceptible to herbicides than grasses. Picloram (0.25 to 2.0 pounds AI/Ac) was the most effective liquid herbicide used to control Chihuahuan desert shrubs, whereas phenoxy herbicides were less effective. Indications are that aerial spraying with 2,4,5-T would have little affect on vegetation growing in association with mesquite, whereas Picloram or Picloram plus 2,4,5-T effectively reduces or kills much of the associated vegetation (Sosebee and Dahl 1979). Forb growth would probably begin increasing during the third growing season. The reduction of forbs as part of the useable forage for livestock would have a minor affect due to the two growing season deferment after treatment.

As the competition for available moisture is reduced, forage species would increase. This increase of additional forage would be three or four times what was previously available.

Martin (1966) found on pastures where mesquite was sprayed, the estimated number of animal units (AUs) to graze 40 percent of the perennial grass crop increased by 169 percent between 1954 and 1961. Cable and Martin (1964) show a perennial grass production increase on mesquite sprayed areas from 220 pounds to 443 pounds per acre. The Jornada Experimental Range Annual Research Progress Report (CY 1979-USDA 1980) indicates a three to eight time production increase of perennial grasses on sprayed areas as opposed to untreated areas in a 3-year period. Stocking rates increased three to four times.

Although good rangeland management practices would prolong the benefits of brush control, retreatment could be needed in 15 to 20 years if brush species started to reinvade the site (National Research Council 1968; Herbel 1982).

Threatened or Endangered Plant Species

Most of the threatened or endangered plant species are located in areas where livestock grazing is limited due to rocky or mountain slopes. Many are unpalatable and would seldom be grazed. These plants could be damaged from trampling or from livestock grazing the associated species. The reduction in livestock numbers under the PA would cause less disturbance to the habitat and reduce grazing on associated plant species. Areas where threatened or endangered plant species occur would be identified and avoided when adverse impacts would occur from vegetation treatments and rangeland developments.

Summary

Under the PA, vegetation would be disturbed or destroyed on 344 acres and 71 acres in the short- and long-term, respectively, from proposed rangeland developments.

The number of acres in each ecological condition would increase in excellent from 1,893 to 18,822; good from 91,082 to 197,712; and fair from 825,651 to 929,142. The number of acres in poor ecological condition would decrease from 512,876 to 285,824. The number of acres in each forage value class would increase in good from 223,460 to 347,019 and fair from 512,381 to 581,155 and decrease in poor from 695,661 to 503,328. Acres would change due to proposed vegetation treatments, grazing management treatments, and rangeland developments.

Desirable and intermediate forage species production would increase three to four times on chemically treated areas. Vegetative ground cover would increase in the long-term from 14 to 16 percent.

No Action (NA) Alternative

Under the NA Alternative, no change in management would occur. Livestock distribution and grazing patterns on most allotments would remain unchanged. Yearlong grazing would continue. Preferred forage species would continue to be heavily utilized every year. Uneven distribution patterns could continue. Areas closest to water would be heavily used. Improvement due to light grazing intensity would increase with the distance from water.

Cattle graze the best forage plants on the most accessible parts of the range 365 days a year (Martin 1966). Productive areas of the rangeland under this non-management situation become less productive. Annual species would invade these depleted areas. Because annual growth is so dependent on rainfall which is so variable, perennial species would have increased grazing pressure in years of low annual production. Increased grazing pressure would reduce the vigor and density of competing perennials.

The projected changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 3-4. The projected changes in percent ground cover from the existing situation as compared to the NA Alternative in the long-term are shown in Table 3-3. These projected changes are based on existing or greater grazing intensities (preference).

Any improvement in rangeland condition would result from climatic condition changes. Extended periods of average or below average precipitation would result in deteriorating rangeland condition. Periods of above average rainfall would result in a temporary improvement in rangeland condition. Since these above average periods occur 1 out of 3 years or 2 out of 10 years, no permanent improvement of rangeland condition would occur.

TABLE 3-4

PROJECTED PUBLIC LAND ACRES BY RANGE SITE FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a/]

(NO ACTION ALTERNATIVE)

Range Site	Ecological Condition (acres) Good	Fair	Poor	Forage Value (acres) Good	Fair	Poor
Southern Desert MLRA 42						
Gravelly		377,942	145,226	11,911	43,721	467,536
Deep Sand			8,613		2,725	5,888
Sandy		16,955	102,573	10,053	18,426	91,049
Loamy		30,375	85,634	19,123	13,525	83,361
Draw	40,079	8,926	5,220	1,859	43,921	8,445
Bottomland	649	2,527	5,097		7,621	652
Limy			5,225		260	4,965
Limestone Hills		270	7,832	1,611	2,374	4,117
Clayey	4,238	46,747	16,655		32,325	35,315
Gravelly Sand		117	3,403		1,274	2,246
Igneous Hills	19,352	136,653	192,560	137,097	97,594	113,874
Salty Bottomland	377	658		520	515	
Gravelly Loam	9,643	15,922	8,127	19,516	14,176	
Salt Flats	33	15,222	39,000	6,370	18,272	29,613
Malpais			18,182		9,369	8,813
Subtotal	74,371	652,314	643,347	208,060	306,098	855,874
Western Plateau MLRA 36						
Gravelly			640		640	
Hills		13,540	14,286	2,318	16,201	9,307
Loamy		1,456	4,180	1,456		4,180
Breaks		3,898	21,856	1,348	23,407	999
Bottomland			610			610
Malpais		1,004		1,004		
Subtotal		19,898	41,572	6,126	40,248	15,096
TOTAL	74,371	672,212	684,919	214,186	346,346	870,970

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Note: a/Acres reflect only the areas transected during the 1981-1982 inventory. Under this alternative, there would not be any acres in excellent ecological condition.

Threatened or Endangered Plant Species

The impacts to threatened or endangered plant species would be the same as the existing situation. Disturbance of plant species and their habitat where the plants are affected by grazing activities would decrease or increase according to grazing intensities.

Summary

The number of acres in poor ecological condition would increase from 512,876 to 684,917. The number of acres in good ecological condition would decrease from 91,082 to 74,371 and fair from 825,651 to 672,212. There are no acres in excellent condition. The number of acres in each forage value class would decrease in good from 223,460 to 214,186 and fair from 512,381 to 346,346 and increase in poor from 695,661 to 870,970. Acres would change due to the lack of grazing management treatments, vegetation treatments, and rangeland developments. Vegetative cover would increase slightly in the long-term from 14 to 15 percent. This could be due to the increased number of annual species replacing perennial species in the range sites.

Maximization (MAX) of Livestock Forage Production Alternative

Under the MAX Alternative, the number of rangeland developments and acres of vegetation treatments would increase considerably over those under the PA. Vegetation would be disturbed or destroyed on 868 acres and 172 acres in the short- and long-term, respectively, from all proposed rangeland developments (see Appendix F-5). Grazing management treatments would be the same as under the PA, initially. The short-term consumption of forage would not change.

The major difference would be the impacts resulting from the increased acres of vegetation treatments with chemicals and mechanical treatments. Creosote on 462,816 acres and mesquite on 412,951 acres of public land would be chemically treated in the Resource Area. Five herbicides are discussed for use in controlling creosote and mesquite under the PA. Impacts as a result of vegetation treatments in Dona Ana County for Dowco 290 and Tebuthiuron are discussed in the Southern Rio Grande EIS (1981). Short- and long-term impacts of chemical treatments are the same as those discussed under the PA.

Mechanical treatment, plus seeding where needed, would be used on 1,208 acres of creosote, 3,287 acres of tarbush, and 735 acres of mixed desert shrub. Short-term impacts from rootplowing treatments would be almost complete elimination of vegetation on the treated areas. Most of the previous vegetative growth would remain on or in the soil as litter or mulch. Seedlings not damaged by these treatments and the reseeding treatments would reestablish cover on these areas. Desirable and intermediate forage species production would increase at least four times on these areas.

Long-term impacts under the MAX Alternative resulting from chemical and mechanical treatments would vary depending on the range site. Range sites to be treated are gravelly, loamy, sandy (shallow sandy), limy, deep sand, clayey, hills, malpais, and gravelly loam. Acres to be treated in each of these range sites are shown in Table 3-3.

Ground cover would be expected to increase from the existing situation in the long-term depending on the range site and residual plant community on these treated areas. Chemical treatments would increase the desirable and intermediate forage species production three to four times.

The projected changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 3-5. The projected changes in percent ground cover from the existing situation as compared to the MAX Alternative in the long-term are shown in Table 3-3.

Threatened or Endangered Plant Species

Impacts on threatened or endangered plant species and their habitat would be the same as those discussed under the PA on areas with no chemical or mechanical treatment. Most plant species grow in areas where treatments are not proposed. Two exceptions are Cereus greggii, night blooming cereus, and Opuntia arenaria, club cholla.

Night blooming cereus grows in association with creosote on gravelly range sites. It grows in the creosote for support and protection. The plants themselves are not utilized by cattle, but are dependent upon surrounding woody vegetation for protection since the plant is brittle and readily broken by cattle nosing in to the bushes for grass (Spellenberg 1978). Treating these areas would reduce the protection provided by creosote, making the plant more vulnerable.

Club cholla grows in sandy range sites among creosote and mesquite. Grazing does not adversely affect this species. It could increase as grazing opens the ground cover. Movement of livestock through an area could help to spread this species (Spellenberg 1978). Picloram, when used at greater than 1 pound AI/Ac would kill Opuntia spp. (Scifres 1980).

Areas where threatened or endangered species occur would be identified and avoided where adverse impacts would occur from rangeland developments and vegetation treatments.

Summary

Under the MAX Alternative, vegetation would be disturbed or destroyed on 868 acres in the short-term and 172 acres in the long-term as a result of proposed rangeland developments.

Impacts resulting from grazing would be the same as those discussed under the PA on areas not being chemically or mechanically treated. The number of acres in each ecological condition would increase in excellent from 1,893 to 18,822 and good from 91,082 to 350,939 and decrease in fair from 825,651 to 811,971 and poor from 512,876 to 249,768. The number of acres in each forage value class

TABLE 3-5

PROJECTED PUBLIC LAND ACRES BY RANGE SITE FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a/]

(MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE)

	Ecological Condition (acres)				Forage Value (acres)		
Range Site	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly		200,748	307,990	14,430	186,428		336,740
Deep Sand			4,445	4,168		7,170	1,443
Sandy		120	68,943	50,465	10,173	70,414	38,941
Loamy		15,614	81,003	19,392	34,737	64,153	17,119
Draw	18,822	23,466	8,939	2,998	4,068	43,934	6,223
Bottomland		1,885	1,574	4,814	1,081	6,823	369
Limy			3,619	1,606		3,879	1,346
Limestone Hills			5,185	2,917	1,611	6,491	
Clayey		38,502	16,556	12,582	21,962	14,436	31,242
Gravelly Sand		41	1,396	2,083	564	2,030	926
Igneous Hills		57,427	240,028	51,110	175,172	173,393	
Salty Bottomland		897	138			1,035	
Gravelly Loam			11,278	22,414	9,873	12,798	11,021
Salt Flats		7,240	16,872	30,143	13,577	19,922	20,756
Malpais			9,665	8,517		18,182	
Subtotal	18,822	345,940	777,631	227,639	459,246	444,660	466,126
Western Plateau MLRA 36							
Gravelly				640		640	
Hills		1,439	26,247	140	3,757	24,069	
Loamy			5,100	536	5,100		536
Breaks		3,560	1,989	20,205	4,908	20,846	
Bottomland				610			610
Malpais			1,004		1,004		
Subtotal		4,999	34,340	22,131	14,769	45,555	1,146
TOTAL	18,822	350,939	811,971	249,770	474,015	490,215	467,272

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Note: a/Acres reflect only the areas transected during the 1981-1982 inventory.

would increase in good from 223,460 to 474,015 and decrease in fair from 512,381 to 490,215 and poor from 695,661 to 467,272. Acres would change due to proposed rangeland developments, grazing management treatments, and increased acres of vegetation treatments.

Desirable and intermediate forage species production would increase three to four times on chemically treated areas and at least four times on mechanically treated and reseeded areas. Vegetative ground cover would increase in the long-term from 14 to 16 percent.

Enhancement of Other Resource Values (EORV) Alternative

Short-term consumption of forage would be reduced approximately 30 percent from the PA under this alternative. This reduction in stocking rates would reduce the use on the forage species. Studies show that after 6 years, lightly grazed pastures have 30 percent more cover than heavily grazed pastures (Dickson et al. 1948). Comparison area studies in the Las Cruces District show that with a light grazing intensity, vegetative ground cover was 87 percent and litter accumulation 44 percent more than on adjacent heavily grazed areas (BLM 1973).

Under the EORV Alternative, vegetation would be disturbed or destroyed on 352 acres and 72 acres in the short- and long-term, respectively, from proposed rangeland developments. Acres of vegetation treatments and the resulting impacts are the same as those discussed under the PA.

Areas eliminated from livestock grazing for watersheds in critical or severe erosion classes or to protect riparian habitat (12,921 acres) would be expected to recover in the long-term if soils are stabilized and new woody and herbaceous species are allowed to reestablish themselves. Ground cover would increase to some degree, stabilizing soils.

The projected changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 3-6. The projected changes in percent ground cover from the existing as compared to the EORV Alternative in the long-term are shown in Table 3-3.

Threatened or Endangered Plant Species

Threatened or endangered plant species and their habitat would be further protected under this alternative by reduced grazing intensities. Areas where threatened or endangered plant species occur would be identified and avoided where adverse impacts would occur from rangeland developments and vegetation treatments.

Summary

Under the EORV Alternative, vegetation would be disturbed or destroyed on 352 acres in the short-term and 72 acres in the long-term from proposed rangeland developments.

TABLE 3-6

PROJECTED PUBLIC LAND ACRES BY RANGE SITE FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a/]

(ENHANCEMENT OF OTHER RESOURCE VALUES ALTERNATIVE)

Range Site	Ecological Condition (acres)				Forage Value (acres)		
	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly		128,000	384,142	11,026	139,911	49,921	333,336
Deep Sand			471	8,142		3,196	5,417
Sandy		4,233	54,502	60,793	14,286	55,973	49,269
Loamy		13,677	83,864	18,468	32,800	67,014	16,195
Draw	26,682	18,694	6,333	2,516	7,156	41,328	5,741
Bottomland		1,885	1,917	4,471	1,081	7,192	
Limy			4,135	1,090		4,395	830
Limestone Hills			6,239	1,863	1,611	6,491	
Clayey	836	42,543	11,352	12,910	26,838	9,232	31,570
Gravelly Sand		77	1,702	1,741	523	2,413	584
Igneous Hills		82,951	233,179	32,435	200,696	147,869	
Salty Bottomland		897	138			1,035	
Gravelly loam		5,370	14,824	13,497	15,244	16,344	2,104
Salt Flats		7,845	20,253	26,157	14,182	23,303	16,770
Malpais			11,931	6,251		18,182	
Subtotal	27,518	306,172	834,982	201,360	454,328	453,888	461,816
Western Plateau MLRA 36							
Gravelly			320	320		640	
Hills		7,489	20,211	126	9,807	18,019	
Loamy		728	4,372	536	5,100		536
Breaks		3,566	6,725	15,463	4,194	21,560	
Bottomland				610			610
Malpais		502	502		1,004		
Subtotal		12,285	32,130	17,055	20,105	40,219	1,146
TOTAL	27,518	318,457	867,112	218,415	474,433	494,107	462,962

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Note: a/Acres reflect only the areas transected during the 1981-1982 inventory.

The number of acres in each ecological condition would increase in excellent from 1,893 to 27,518; good from 91,082 to 318,457; and fair from 825,651 to 867,112. The number of acres in poor ecological condition would decrease from 512,876 to 218,413. The number of acres in each forage value class would increase in good from 223,460 to 474,433 and decrease in fair from 512,381 to 494,107 and poor from 695,661 to 462,962. Acres would change due to proposed vegetation treatments, grazing management treatments, and rangeland developments.

Impacts resulting from vegetation treatments would be the same as those under the PA. Desirable and intermediate forage species production would increase three to four times on chemically treated areas. Vegetative ground cover would increase in the long-term from 14 to 17 percent.

Elimination of Livestock Grazing (ELG) Alternative

Under the ELG Alternative, vegetative response would vary according to range site, vegetative subtype, and condition class. The vegetative resource would still be governed by climatic conditions. Droughts in the semiarid desert region are not uncommon. Black grama, one of the preferred forage species, was reduced by 38 percent and in some cases eliminated between 1916 and 1934. From the 1951-1956 drought, this species was reduced 1 to 50 percent depending on the soil type (Herbel and Gould 1980).

Blydenstein et al. (1957) indicates the most notable change under protection was an overall increase in the density of the vegetation, although most of the same species occurred on both the protected and unprotected areas. With increased vegetation densities come increased litter accumulations. Fire damage and danger could increase. With more fuel, fires would be hotter, causing more damage to the existing site. Fire tolerant species would increase.

By excluding livestock grazing, positive results from grazing would not be realized. Some of the effects of managed livestock grazing are: loosening of soil surface during dry periods; incorporation of mulch into the soil profile to speed humus development; nutrient recycling and increased availability in the ecosystem; trampling of seeds into the soil; reduction of excess accumulation of standing dead vegetative material which chemically and physically inhibits new growth; inoculation of plant parts with saliva to stimulate regrowth; or reduction of fire, insect, and rodent problems associated with vegetation accumulation (Holechek 1981). Proper grazing stimulates plant growth in many cases (Stoddart et al. 1975).

The projected changes in the number of acres in each ecological condition and forage value class as a result of changes in species composition are shown in Table 3-7. The projected changes in percent ground cover from the existing situation as compared to the ELG Alternative in the long-term are shown in Table 3-3.

TABLE 3-7

PROJECTED PUBLIC LAND ACRES BY RANGE SITE FOR EACH ECOLOGICAL CONDITION AND FORAGE VALUE CLASS[a/]

(ELIMINATION OF LIVESTOCK GRAZING ALTERNATIVE)

	Ecological Condition (acres)				Forage Value (acres)		
Range Site	Excellent	Good	Fair	Poor	Good	Fair	Poor
Southern Desert MLRA 42							
Gravelly		203,780	316,221	3,167	197,691		325,477
Deep Sand			819	7,794		3,544	5,069
Sandy		8,345	60,989	50,194	18,398	62,460	38,670
Loamy		14,324	88,045	13,640	33,447	71,195	11,367
Draw	34,541	13,923	3,727	2,034	10,244	38,722	5,259
Bottomland		1,885	2,259	4,129	1,081	7,192	
Limy			4,746	479		5,007	218
Limestone Hills			7,293	809	1,611	6,491	
Clayey	1,672	48,697	5,848	11,423	33,829	3,728	30,083
Gravelly Sand		113	2,009	1,398	636	2,643	241
Igneous Hills		108,475	226,330	13,760	226,220	122,345	
Salty Bottomland		897	138			1,035	
Gravelly Loam		10,740	18,909	4,043	20,613	13,079	
Salt Flats		8,451	23,633	22,171	14,788	26,683	12,784
Malpais			14,197	3,985		18,182	
Subtotal	36,213	419,630	775,163	139,026	558,558	382,306	429,168
Western Plateau MLRA 36							
Gravelly			640			640	
Hills		13,539	14,176	111	15,857	11,969	
Loamy		1,456	3,644	536	5,100		536
Breaks		3,572	11,462	10,720	4,920	20,834	
Bottomland				610			610
Malpais		1,004			1,004		
Subtotal		19,571	29,922	11,977	26,881	33,443	1,146
TOTAL	36,213	439,201	805,085	151,003	585,439	415,749	430,314

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Note: a/Acres reflect only the areas transected during the 1981-1982 inventory.

Threatened or Endangered Plant Species

Adverse impacts to threatened or endangered plant species and their habitat from livestock grazing would be removed. Any beneficial impacts favoring the growth and reproduction of these species also would be removed.

Summary

The number of acres in each ecological condition would increase in excellent from 1,893 to 36,213 and good from 91,082 to 439,201 and decrease in fair from 825,651 to 805,085 and poor from 512,876 to 151,001. The number of acres in each forage value class would increase in good from 223,460 to 585,439 and decrease in fair from 512,381 to 415,749 and poor from 695,661 to 430,314. Vegetative ground cover would increase in the long-term from 14 to 18 percent.

Proposed Special Designation Areas

Proposed Action (PA)

Restrictions on surface disturbing and mechanized activities within all the proposed Areas of Critical Environmental Concern (ACECs), would provide long-term protection and enhancement for the existing vegetation.

Gila Lower Box Riparian ACEC

By restricting livestock use through total exclusion on limited areas in the short-term (2-3 years) and exclusion where necessary during the growing season in the long-term, bottomland species could reestablish themselves. Ground cover would also improve.

Gila Middle Box Wildlife ACEC

Designation of the ACEC would have little impact on vegetation since little vegetation grows in the steep canyon of the Middle Box.

Soils

Energy Minerals

Proposed Action (PA)

In the long-term under the PA, soils would be disturbed on approximately 32,480 acres of public land by 20,300 miles of seismic lines. The susceptibility of soil erosion by wind and water would increase slightly in the short-term as the soil surface is exposed where vegetation is destroyed along the seismic lines. Soils of the gravelly, gravelly loam, hills, and breaks range sites would be most susceptible to water erosion, especially on slopes. Sandy soils of the sandy, deep sand, and loamy range sites would be more susceptible to wind erosion. Off-road travel would increase soil compaction on fine-textured soils of the clayey, draw, bottomland, and salt flats range sites. If the soils are wet, heavy equipment would cause ruts on these soils, which would require more time for healing. Visuals showing locations of range sites and vegetative subtypes in the 3-County Area are available for review in the Las Cruces District Office. Areas with uniform grass cover would revegetate sooner than areas with very little perennial grass or forb understory and dominated by shrubs such as creosote or tarbush. Long-term soil impacts resulting from geophysical exploration would not be significant if these areas are allowed to heal without further disturbance (e.g., recreational ORV travel on visible seismic lines).

Exploratory drilling operations would disturb or remove surface soil on an estimated 213 acres for drill pad preparation, access roads, shallow temperature gradient holes, and other facilities associated with oil and gas and geothermal drilling. Non-producing wells for oil and gas would be abandoned and an estimated 53 acres would be reclaimed by reshaping the area, replacing topsoil, and reseeding the site with an appropriate seed mixture. A successful reclamation operation would decrease sediment yields on these areas. Unsuccessful reseeding operations would result in increased soil erosion on these areas, as would the drill pads where producing wells are located. The impacts would be of slight significance however because of the small acreage involved when compared to the entire Resource Area.

Rangeland Management

Proposed Action (PA)

The installation of new rangeland developments (see Appendix F-4) under the PA would disturb soils on approximately 344 acres in the short-term during construction of the developments. In the long-term, approximately 71 acres of soils would be removed from production of vegetation. Additional acreages of soils around newly installed water developments would be compacted due to increased livestock use. The compacted soils would result in decreased water infiltration rates and increased runoff and water erosion. The increased soil erosion from these areas would be insignificant to total sediment yield rates of the 3-County Area.

Under the PA, there would be an estimated 2.6 percent reduction in total AUMs from existing preference in the long-term. There would be a slight reduction in soil erosion by wind and water where ground cover is improved due to reduced livestock use, but changes in wind erosion rates and total sediment yields would not be significant.

An estimated 42,279 acres of creosote and 9,609 acres of mesquite would be chemically treated for brush control under the PA. The herbicides used for brush control would be soil-applied (for uptake by roots) or foliage-applied (taken in through leaves of actively growing shrubs). When applied, the herbicides infiltrate and leach into the soil profile with rainwater. Studies have shown that most herbicides are absorbed by soil particles and held in the upper part of the soil (Bovey et al. 1982, O'Connor et al. 1980). The herbicides would not leach farther than the wetting front of rainwater in the soil, therefore would not contaminate underground water tables (see Chapter 3, Water Resources) when applied using standard operating procedures (see Appendix B-1).

Once in the soil, the primary factors affecting the length of residual activity of the herbicides are microbial decomposition, chemical decomposition, and absorption on soil colloids. There are no documented cases of herbicides, at normal rates under field conditions, significantly reducing microbial growth. On the contrary, detoxification of herbicides by microorganisms is a method of regulating persistence of many herbicides in the soil (Scifres 1980). Foliage-applied phenoxy herbicides such as 2,4,5-T are highly susceptible to microbial decomposition and are unlikely to persist into the succeeding year even at extremely high rates (Upchurch 1966). On the other hand, soil-applied herbicides such as Tebuthiuron are formulated to be leached into the soil, taken up by the plants in the roots, and are not decomposed as readily by soil microbes. Residues of Tebuthiuron persist in soils and are effective for two years or more following application (Bovey et al. 1982), depending on rates of application and soil types. Residues of Dicamba would not be expected to persist for over a year since Dicamba has a half-life of approximately 25 days (Scifres 1975). Studies show a half-life of 27 days for Dowco 290 although further studies are needed to elucidate degradation and soil leaching characteristics under different soil conditions (Dow Chemical Co. n.d.). A study on Picloram showed that it had decomposed to trace amounts 112 days following application on sandy rangeland soils (Scifres et al. 1977).

Soil erosion by wind and water would increase slightly in the short-term where creosote is chemically treated on 42,279 acres of the gravelly, gravelly loam, and loamy range sites due to decreased ground cover following the spray treatments. In the long-term, however, wind and water erosion would decrease on areas where vegetative ground cover is improved following the treatments. The changes in water and wind erosion rates would not be significant.

Under the PA, 9,609 acres of mesquite would be chemically treated for brush control on areas of the sandy and deep sand range sites. Soil erosion by water would not measurably change on these areas because of nearly level slopes and rapid infiltration rates of the soils of these sites.

Soil movement by wind would decrease within the treatment areas. A two-year study on the Jornada Experimental Range (Gould 1982) on a duned mesquite sandy range site, where there was a 48 to 84 percent control of mesquite, showed the amount of wind blown soil in the unsprayed area was more than 15-fold greater than at 180 meters (585 feet) into the sprayed area. Intermediate amounts were measured between the boundary and 180 meters into the treated areas. The studies were conducted from February through May, 4 and 5 years following treatments. The study also indicated that after the mesquite was killed, the stems deteriorated and provided less protection to the top and sides of the dunes. As a result, the dunes were reduced in height with soil being deposited in the inter-dune areas.

Summary

Changes in total sediment yields and wind erosion rates resulting from the changes in livestock numbers under the PA would be insignificant in the long-term. The installation of rangeland developments would remove soils from production of vegetation on 344 acres in the short-term and 71 acres in the long-term.

Chemical treatments on 42,279 acres of creosote would increase soil erosion by wind and water slightly in the short-term, but would decrease in the long-term due to increased vegetative ground cover. The changes in water and wind erosion rates would not be significant. Soil loss by water would not measurably change on mesquite-spray areas, but soil erosion by wind on sprayed areas would decrease 15 times as much as on unsprayed areas.

No Action (NA) Alternative

Under the NA Alternative, rangeland developments and vegetation treatments would continue as as present. Therefore, soil erosion by wind and water would remain essentially the same as the present situation except for those areas with a downward trend in cover. As cover decreases, sediment yields and wind erosion would increase, but the changes would not be significant in the short- or long-term.

Maximization (MAX) of Livestock Forage Production Alternative

The construction of rangeland developments under the MAX Alternative (see Appendix F-5) would disturb soils on approximately 868 acres in the short-term and remove approximately 172 acres of soils from production of vegetation in the long-term. Soils around newly installed water developments would be compacted by increased livestock use, especially where dirt tanks are constructed on fine-textured soils. The compacted soils would have decreased water infiltration rates resulting in increased runoff and rates of soil erosion from these areas. However, there would not be a significant change in total rates of sediment yield from the 3-County Area.

Under the MAX Alternative, an estimated 462,816 acres of creosote and 412,951 acres of mesquite would be chemically treated for brush control in the Resource Area. The impacts to soils would be the same as those discussed under the PA, but much more acreage would be treated under this alternative. In addition, 5,230 acres of creosote, tarbush, and mixed desert shrub would be rootplowed on deep soils of the loamy and sandy range sites under the MAX Alternative. During the rootplow operation, a blade connected to a tractor severs plant roots 6 to 15 inches below the soil surface. The surface layer of soil would be disturbed creating a suitable seedbed for reseeding the site. The dead vegetation would be replaced on the soil surface which helps the exposed, reseeded soils to retain moisture. The success of this operation depends on precipitation received following reseeding. In the short-term, soil erosion by wind and water would increase on these sites due to the removal of protective vegetative cover. After vegetation becomes established following reseeding, soil erosion by wind and water would decrease.

Under this alternative, total AUMs would increase an average of approximately 13 percent above current preference in the long-term with new rangeland developments and vegetation treatment projects because of better distribution of livestock. Average total vegetative ground cover would not change enough to significantly affect total sediment yields in the 3-County Area.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative, reductions in livestock numbers on poor and fair condition rangelands would slightly decrease water and wind erosion, but the decrease would not be significant. Sediment yields would also decrease on the 12,501 acres on breaks of the Gila River Valley where livestock grazing is eliminated. The installation of rangeland developments would disturb soils on 352 acres in the short-term and 72 acres in the long-term, but the disturbances would not be a significant impact to the total soil resource of the 3-County Area.

Elimination of Livestock Grazing (ELG) Alternative

Under the ELG Alternative, all livestock would be removed from public land; therefore further soil disturbances resulting from livestock grazing would be eliminated. Soil erosion by water would decrease slightly on areas where vegetative ground cover is increased, but overall, sediment yields would not change significantly. Wind erosion susceptibility would also decrease slightly, but there would be no change in the wind erodibility group of the soils.

Wildlife

Energy Minerals

Proposed Action (PA)

Surface disturbance from energy minerals exploration and production is only expected on slopes of 20 percent or less. Because of this, Standard Habitat Sites (SHS's) on steeper slopes would not be significantly affected. These SHS's are mixed shrub mountain and hill, grass, pinyon-juniper and conifer mountain, and oak draw. The SHS's which would be impacted are discussed in the following section as are special habitat features. Direct effects on wildlife also are analyzed.

Geophysical and drilling exploration, expected areawide on more level terrain, would affect the creosote, mixed shrub, half shrub, mesquite and grass rolling upland, mesquite dune, grass flat, pseudoriparian, and riparian SHS's. Surface disturbance on creosote, mixed shrub, half shrub, and mesquite types would not significantly affect wildlife. In most cases, these sites are not valuable wildlife habitat, as evidenced by low faunal and floral diversity, low ecological condition class ratings, and the number of species reliant on these habitat types.

More valuable habitats such as grass flat and rolling upland could be damaged by energy minerals activities. In both, the soaptree yucca is an important component, and if yuccas were knocked down, nest sites would be destroyed (see Table 2-9). Since yuccas are slow-growing, this would be a long-term impact. Grass flats, which have good ground cover, support the highest reptile and amphibian diversity of any SHS. Destruction of ground cover would locally affect the composition of the reptile community in the short-term. Grass habitats also are valuable for pronghorn, and habitat disturbance would remove a minor amount of forage.

Most riparian acreage in the Resource Area is covered by protective stipulations for energy minerals development activities. Geophysical exploration could be carried on with certain mitigating measures. Energy minerals activities in pseudoriparian habitats could remove a number of trees and shrubs and directly disturb the wildlife associated with these habitats.

Assuming even distribution areawide for exploration, 3,800 acres of grass flat, 4,246 acres of grass rolling upland, and 330 acres of pseudoriparian habitat would be disturbed by 2010. Although the latter is a small acreage, pseudoriparian sites occur in narrow strips generally no more than 200 feet in width, and 330 acres makes up 2 percent of the total pseudoriparian habitat.

In some cases, special habitat features would be affected by energy minerals activity. Most special habitat features (e.g., buildings, waters, mines) are small enough that they could be avoided. (In site-specific Environmental Assessments (EAs), these features would be pinpointed.) The more extensive features (e.g., cliffs and playas) would be impacted. The major cliff nesting areas such as the Florida Mountains and Alamo Huecos have protective stipulations. Exploration in these mountain ranges would generally be done on foot or by helicopter, so very little habitat disturbance would be involved. However, raptors, bats, and other rock-dwelling wildlife could be disturbed by the noise and human presence. This would be a significant short-term impact in the case of nesting raptors, bat colonies, or any wildlife which depend on these cliffs for part or all of their life requirements.

Exploration drilling in playas during spring or fall migrations would disturb local use patterns of waterfowl. This would not be a major problem since only a small part of the playas would be involved in any drilling activity.

Big game and their habitat would not be seriously affected by energy minerals activity, but localized impacts would be expected. Exploration in pseudoriparian and riparian SHS's would destroy some forage and cover for mule deer and javelina, as well as directly disturbing the animals. The SHS's most utilized by pronghorn are likely sites for oil and gas exploration and development because they are on slopes of less than 20 percent. Short-term forage losses would occur on approximately 21 sections. At the predicted rate of 3,800 acres disturbance in grass flats, 4,246 in grass rolling upland, and 5,662 in half shrub rolling upland, the amount of forage loss would be minor.

These acreages are incapable of supporting more than 10 pronghorn (see Map 2-1).

Several more serious problems could arise. Vehicular exploration could stress pronghorn contributing to mortality. This could be a significant problem during fawning season. More human presence would be expected because of oil and gas activity. Besides company employees, recreationists could use the new access roads and seismograph trails. Added human presence increases the possibility of poaching on pronghorn, mule deer, and javelina. Brine evaporation ponds and sludge pits at well sites create a hazard for birds which may try to land or drink from them and some mortality would occur.

In steep terrain, big game habitat would not be destroyed, but direct disturbance to big game could be possible where explosive methods of exploration are used. Areas of bighorn sheep occupation and future transplant sites all have protective stipulations, so bighorn sheep would not be affected. Deer, in areas not covered by stipulations, would be vulnerable to stress from exploration activity. In the short-term, this could alter normal behavior patterns, resulting in mortality.

Threatened or endangered wildlife species are protected from direct disturbance by required clearances and stipulations on known habitat areas. In areas other than these, added human presence could lead to accidental deaths and the increased likelihood of collection of rare animals. Highly mobile species such as whooping cranes are vulnerable, as are widespread species such as the Gila monster. In addition, valuable habitat could be disturbed. Several species, such as Baird's sparrow, are dependent on grass SHS's. Pseudoriparian SHS's are also valuable habitats for a great number of threatened or endangered animals in the Resource Area. In nearly every case, loss of habitat is a major factor in the endangerment of these species. Therefore, any loss of habitat in grass or pseudoriparian sites would be significant.

Summary

Some habitat destruction would occur with energy minerals activity. Most of the impacts would be short-term, but yucca and tree loss would be long-term. The impacts would be most significant in the grass flat, grass rolling upland, and pseudoriparian SHS's because they are valuable for wildlife. These SHS's are also some of the most important habitats for threatened or endangered wildlife species.

Loss of forage for big game would not be significant. A more serious problem would be human disturbance and the possibility of increased poaching. Human disturbance also would be a problem for some threatened or endangered wildlife species.

No Action (NA) Alternative

Under the NA Alternative, energy minerals activities would continue as at present. In a few specific geographic areas, there could be impacts to the wildlife resource. The Florida Mountains would be open to leasing. Very little development would occur in the mountains themselves, but exploration work would still be done. The noise and activity associated with explosives could disturb nesting raptors; eagles, prairie falcons, and red-tailed hawks all nest in the range. Nest failure could be possible under these circumstances.

This activity also could disrupt the normal behavior of mule deer and ibex, stressing them and possibly causing a few deaths. Big game could move into other areas where they would have to compete for forage with wildlife and livestock already using those areas. This is a matter for concern because the New Mexico Department of Game and Fish (NMDGF) and BLM have agreed that ibex are to be limited to the Florida Mountains (USDI BLM 1979).

Hadley Draw in the Cooke's Range also would be open to leasing. A similar situation exists in that raptor nesting could be disrupted, although this area has far fewer raptors than the Florida Mountains because it is a small area. Some riparian vegetation could be destroyed and the water source polluted.

NMDGF's Redrock Game Farm would continue to be open to leasing. Energy minerals activity could disturb captive bighorn sheep which are necessary for the reintroduction program. Bighorn sheep are vulnerable to a variety of illnesses, many of which are stress-related (USDI BLM 1980). Deaths in the captive herd are quite likely if they are stressed. This could be a serious impact in light of their low numbers and their confined condition.

Maximization (MAX) of Energy Minerals Leasing Alternative

Under this alternative, there would be no special protective stipulations on riparian areas. This means that the Gila River, Hadley Draw in the Cooke's Range, San Simon Cienega, and Guadalupe Canyon would all be open to leasing. Since vegetation is concentrated in small areas, energy minerals activity on these sites could remove a large proportion of the vegetation. This would cause a significant loss of both food and cover for 332 vertebrate species associated with riparian habitats. The loss would be long-term since tree and shrub species are slow-growing.

Oil and gas operations close to a river create the potential for oil spills and brine contamination. An oil spill would be harmful for fish as well as for terrestrial species which drink out of the river, for waterfowl which land on the river, and for animals which feed on aquatic species (such as black hawks and herons). Depending on the extent of such a spill, a significant amount of mortality could result.

Besides the possibility of habitat degradation, energy minerals activity would disturb wildlife in the immediate vicinity. Additional human presence could lead to poaching and collecting of some animals. Twenty-six Federal and state threatened or endangered wildlife species in the Resource Area are associated with riparian areas, finding some or all of their life requirements in this SHS. Protection of habitat or protecting the species from persecution or collection are the primary conservation measures required for almost every one of these species. Development in riparian areas would be extremely detrimental to threatened or endangered wildlife species.

In the Aden Lava Flow, 4,000 acres of malpais SHS are currently covered by a protective stipulation. Under the MAX Alternative, they would be open and geothermal exploration or development could occur. Development on the malpais would destroy or displace animals in the immediate vicinity. This is significant locally because there are unusual wildlife values associated with the lava flow.

A number of other areas which have special wildlife values would be open to leasing. Most of these are the major cliff and mountain areas where there is raptor nesting: the Alamo Huecos, Cooke's Range, Floridas, and Organs. Oil and gas activity during mating and nesting seasons could disrupt normal reproductive behavior and cause nest failure. Two species, golden eagles and prairie falcons, which nest in these ranges are relatively uncommon.

The Alamo Huecos, Big Hatchets, Cooke's Range, Cowboy Spring, Gila Lower Box, Organs, Peloncillos, and NMDGF's Redrock Game Farm are all used by bighorn sheep or are possible future transplant sites. Bighorn sheep are already in the Big Hatchets and Peloncillos. Unlimited oil and gas activity would destroy some forage and disrupt the bighorn sheep. This could change normal behavior patterns, stressing the bighorn sheep so that they would be more vulnerable to predation and illness. They could be forced into areas where they are unfamiliar with escape terrain or would have to compete with deer and cattle for forage. Since the situation is so precarious for existing bighorn sheep herds, reestablishing other herds is vital. The other ranges all have some potential for this, but need more study. Without protection, future transplant sites could become unsuitable for sheep. NMDGF's Redrock Game Farm, essential for the bighorn sheep program, could also become unsuitable if energy minerals activities were permitted. Excessive noise and human presence would be extremely stressful for bighorn sheep.

The mountain ranges mentioned as raptor and bighorn sheep areas are also inhabited by other big game: mule deer, white-tailed deer, ibex, and javelina. While development would not be expected in these mountain ranges, exploration methods involving explosives are possible under this alternative. None of the big game species are as sensitive as bighorn sheep, but any of them could exhibit behavioral changes and would probably move away from the noise and activity of the exploration line. Some mortality would undoubtedly occur although not in great numbers. Exploration work during the breeding season could affect normal reproductive behavior and lower natality rates.

Summary

Exploration and development could affect a number of areas which have important wildlife values: riparian areas, the Aden Lava Flow, NMDGF's Redrock Game Farm, and several mountain ranges which have nesting raptors, bighorn sheep, and other big game species.

Enhancement of Other Resource Values (EORV) Alternative

Under this alternative, impacts to wildlife derive from stipulations for energy minerals leasing. In the Cooke's Range, Cowboy Spring, Floridas, and Gila River riparian areas, no surface occupancy would be allowed and NMDGF's Redrock Game Farm would not be open to leasing. Currently, the Floridas are open to leasing and the other areas have a protective stipulation which permits some control of energy minerals activity. This stipulation is designed to protect significant wildlife values such as threatened or endangered species and nesting raptors. Oil and gas exploration and leasing would be allowed if it could be done without impairing these values. The no surface occupancy stipulation proposed under the EORV Alternative provides protection from disturbance for all species, not just the more sensitive and rare ones. It also ensures that no habitat degradation would occur from energy minerals development. However, exploration and associated surface disturbance would still be possible.

Rangeland Management

Proposed Action (PA)

Management of the 71 Category I allotments and parts of 10 others would improve ecological condition by 10 points by 2010. (See Appendix B-4 for an explanation of ecological condition class ratings.) Table 3-8 projects how many acres of each SHS would improve one condition class. Faunal and floral diversity is compared between condition classes where information is available. In addition to the 10 point improvement, 51,888 acres of creosote and mixed shrub and mesquite rolling uplands are proposed for chemical vegetation treatment (see Appendix B-1 for vegetation treatment guidelines). These areas would improve one condition class. Category M and C allotments would not change significantly. The conifer mountain SHS is not grazed by livestock and would not be impacted.

Standard Habitat Sites (SHS's)

Anticipated change in SHS's are discussed as they relate to various wildlife species. Table 3-8 shows comparison data between ecological condition classes. Plant diversity usually shows major changes between condition classes (the higher the number, the more diverse the plant community). In most cases, the shrub composition by weight declines as condition improves.

Bird diversities generally follow plant diversities. (See Figure 3-1.) Therefore, bird diversities would be expected to increase when plant diversities do. In creosote, half shrub and mesquite rolling upland, mixed shrub hill, and mesquite dune, an increase in both diversities would be expected (see Table 3-8).

TABLE 3-8

COMPARISON OF ECOLOGICAL CONDITION CLASSES WITHIN STANDARD HABITAT SITES

Standard Habitat Sites	Total Acres	Acres/% Which Would Change To:[a]		Plant Diversity Index			% Composition Trees and Shrubs			Average Number of Plant Species			Mammals Diversity Index			Birds Diversity Index	
		Good	Fair	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Fair	Poor
Creosote Rolling Upland	785,651	39,440/5	39,431/5	2.66	1.88	1.1	40	51	55	12	11	6	b/	1.19	1.47	b/	b/
Mixed Shrub Mountain	240,036	4,729/2	31,270/13	b/	1.65	1.86	b/	46	51	b/	13	13	b/	.56	.38	1.11	1.02
Mixed Shrub Rolling Upland	273,162	12,392/5	20,667/8	1.29	1.43	1.7	18	48	63	7	8	9		b/		1.83	1.83
Mixed Shrub Hill	64,166	3,883/6	14,861/23	b/	2.27	1.89	b/	44	43	b/	14	12	b/	1.51	1.58		b/
Half Shrub Rolling Upland	243,302	12,750/5	18,308/8	1.27	1.54	.91	2	38	13	5	9	4	b/	.61	1.08		b/
Mesquite Rolling Upland	122,816	1,356/1	15,287/12	1.84	.75	.86	25	25	64	7	6	7		b/		.95	1.71
Mesquite Sand Dunes	52,975	0	0	b/	1.17	.81	b/	48	57	b/	6	4	b/	1.21	1.01		b/
Grass Flat	177,217	2,761/2[c]	2,351/1	.68	.87	1.77	0	6	16	5	5	9	1.09	1.49	1.81	1.48	1.87
Grass Rolling Upland	235,045	11,841/5	24,955/11	1.64	1.44	1.54	11	33	24	6	12	10	- - - - - - - - b/ - - - - - - -				
Grass Mountain	234,208	13,420/5	24,552/10	2.54	2.34	3.4	6	15	52	10	19	13	.79	1.03	.79	2.49	1.88
Pinyon-Juniper Grass Mountain	46,449	0	4,488/9	b/	2.01	2.31	b/	31	55	b/	15	18	b/	1.0	.58		b/
Pseudoriparian	15,092	52/1	11,936/79	b/	2.43	2.69	b/	32	69	b/	13	13	- - - - - - - - b/ - - - - - - -				
Riparian	5,338	0	65/1	- b/ -													
Oak Draw	1,826	0	227/2	- b/ -													
Conifer Mountain	1,789	- No Data by Condition Classes -															

Source: BLM Integrated Habitat Inventory Classification System Data, 1981.

Notes: a/The acreages listed are the summation of site write-up areas which would increase one condition class under the PA.

b/No data for this condition class; or all transects run were in one condition class so there is no basis for comparison.

c/16,985 acres of grass flat are predicted to improve to the excellent category (10%).

The half shrub SHS would lose shrub cover if ecological condition improves to good. If yuccas decrease, there would be a decrease in nesting birds. BLM nesting surveys (1981) showed yuccas to be important for a number of nesting birds; 14 percent of reported nests were built in soaptree yuccas.

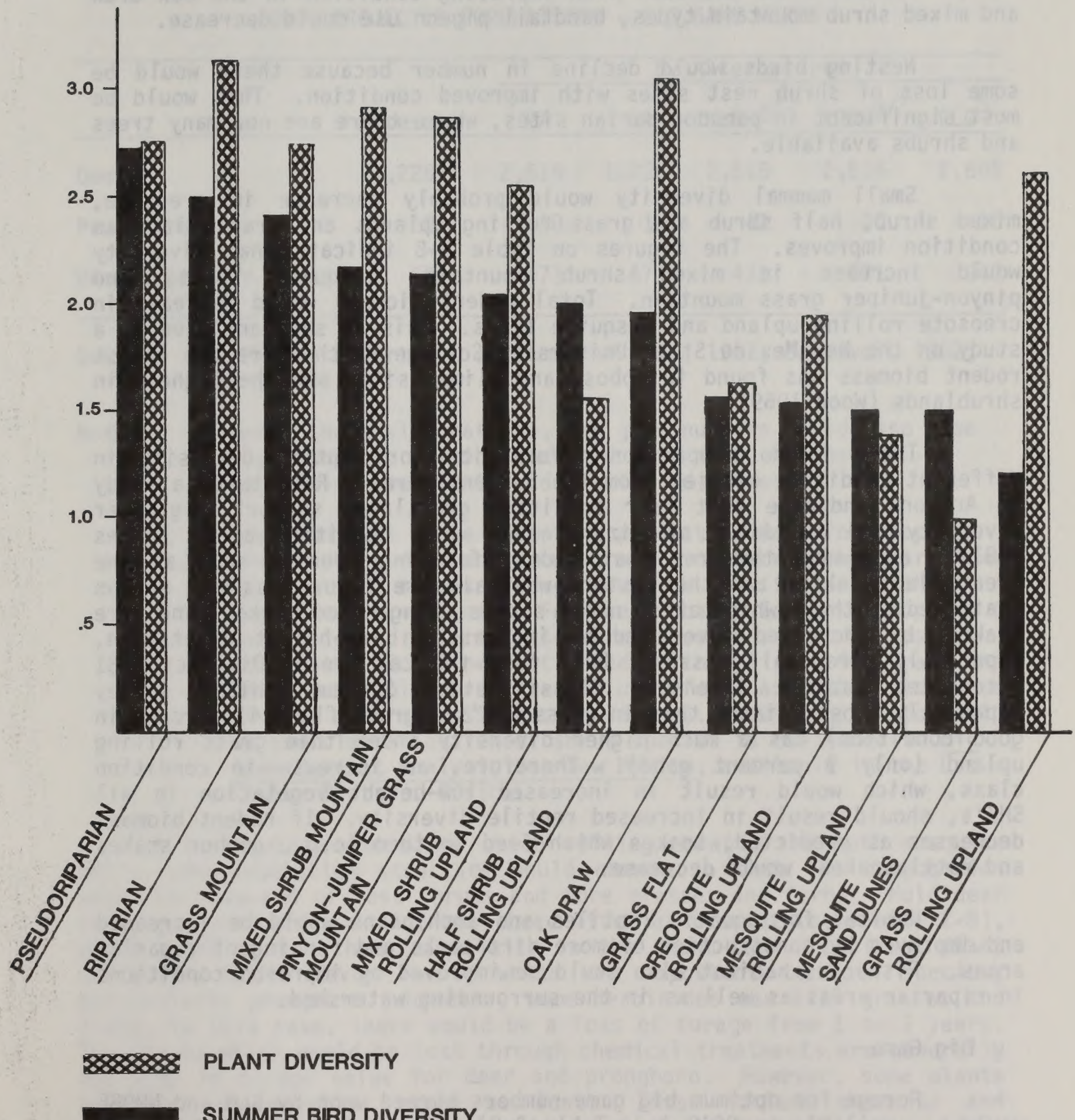
Mixed shrub mountain and mixed shrub and grass rolling upland SHS's would not change much in plant diversity, so neither would bird diversities. However, 720 acres of mixed shrub rolling upland would be chemically treated. Since a maximum shrub kill rate of 60 percent would occur, this treatment could result in more plant diversity.

The grass flat SHS would also lose some shrub cover as ecological condition improves; bird diversity would decrease. This would probably also occur in grass mountain, pinyon-juniper grass mountain, and pseudoriparian sites.

There is no comparison data between condition classes in riparian and oak draw sites. Proposed rangeland developments in

FIGURE 3-1

COMPARISON OF SUMMER BIRD DIVERSITIES AND PLANT DIVERSITIES BY STANDARD HABITAT SITE



SOURCE: BLM Las Cruces District Range Inventory Data 1981-1982
BLM Las Cruces IHICS Data 1981

riparian sites, such as fencing and constructing new waters away from streams, would lessen grazing impacts on riparian areas. This would result in increased food and a diversified vegetation structure.

Game bird populations would show short-term increases in creosote, mixed shrub, half shrub, mesquite, pseudoriparian, and riparian sites because there would be more food available. However, long-term plant succession might not favor game birds (Davis et al. 1975). If oak trees decrease with improving condition in the oak draw and mixed shrub mountain types, bandtail pigeon use could decrease.

Nesting birds would decline in number because there would be some loss of shrub nest sites with improved condition. This would be most significant in pseudoriparian sites, where there are now many trees and shrubs available.

Small mammal diversity would probably decrease in creosote, mixed shrub, half shrub and grass rolling uplands and grass flats as condition improves. The figures on Table 3-8 indicate that diversity would increase in mixed shrub mountain, mesquite sites, and pinyon-juniper grass mountain. Total rodent biomass would decrease in creosote rolling upland and mesquite types. This is substantiated by a study on the New Mexico State University College Ranch where the lowest rodent biomass was found in tobosa and climax sites and the highest in shrublands (Wood 1969).

There is no comparison information for reptile diversity in different condition classes from the 3-County Area. Results of a study in Arizona indicate that fair condition grasslands support a greater diversity and abundance of lizards than poor condition areas (Jones 1981). Jones hypothesizes that widely foraging species such as the Great Plains skink and the Western whiptail are favored as are snakes that feed on them (whipsnakes, night snakes, long-nosed snakes, and lyre snakes) by increased cover and an increase in low-height vegetation, especially perennial grasses. Data from the Las Cruces District 1981 Integrated Habitat Inventory Classification System (IHICS) survey apparently substantiates this in grass SHS's: grass flat (41 percent in good condition) has a much higher diversity index than grass rolling upland (only 9 percent good). Therefore, an increase in condition class, which would result in increased low-height vegetation in all SHS's, should result in increased reptile diversity. If rodent biomass decreases as predicted, snakes which feed on them (e.g., gopher snakes and rattlesnakes) would decrease.

Habitat for aquatic reptiles and amphibians would be increased and improved by construction of more dirt tanks and fencing of riparian areas. Fisheries habitat also would be improved by improved conditions in riparian areas as well as in the surrounding watershed.

Big Game

Forage for optimum big game numbers agreed upon by BLM and NMDGF would be available by 2010 (see Table 3-9). Allotments within big game herd areas (Map 2-1) are all classified in Category I, or partially, with the exception of those outside the grazing district in the southern Peloncillos. A long-term 10-point increase in condition would occur on all these areas except those proposed for treatment, where there may be an even greater increase. Therefore, more forage would be available to big game. Plant composition and structural changes are as significant as is the forage increase (Yoakum 1980; Schmidt and Gilbert 1978).

TABLE 3-9

2010 PROJECTED POPULATIONS - BIG GAME HERDS

		By Alternatives				
	Present	PA	NA	MLFP[a/]	EORV[a/]	ELG[b/]
Deer	1,226	2,515	1,226	2,515	2,515	2,865
Pronghorn	10	30	10	42	30	16
Desert Bighorn Sheep	55	471	471	471	471	940

Source: New Mexico Department of Game and Fish, 1982; Sandoval, 1982; Bavin, 1982.

Notes: a/ Under these alternatives, big game numbers would also rise significantly outside the herd unit areas because of vegetation treatments and grazing adjustments.

b/ Based on 1981 Range Inventory production data for species preferred by deer and pronghorn. Pronghorn numbers are lower than optimum because forage would be insufficient without vegetation treatments. For deer, actual forage production of desirable and intermediate shrub species and forbs was calculated and 15 percent added to this figure for grass and least desirable shrub species use (fecal analysis files were used to determine 15 percent figure). Additional information on the classification of shrub species is contained in Big Game Habitat Analysis for New Mexico, available in the Las Cruces District Office.

In creosote and mixed shrub rolling uplands and both mesquite SHS's, the vegetation structure would change so that the composition would be composed of less shrubs and more grasses and forbs. Mule deer and pronghorn, which do not use these sites at present (see Table 2-8), would begin to use them, especially in the short-term. Earliest plant succession would favor forbs, which are important to both species, particularly pronghorn. However, some herbicides can kill grasses and forbs; in this case, there would be a loss of forage from 1 to 3 years. The shrubs which would be lost through chemical treatments are generally not high in forage value for deer and pronghorn. However, some plants preferred by javelina could be lost. These include mesquite and pricklypear. Openings caused by the loss of shrubs would create more suitable habitat for pronghorn and would improve deer habitat.

The mixed shrub mountain SHS would not have significant changes in composition and structure (see Table 3-8). The major change would be more forage production, which would benefit big game animals. Sandoval (1981) describes bighorn sheep as opportunistic feeders, so an increase in grasses and forbs could benefit them. Expected change in vegetation structure is slight (51 percent to 46 percent shrubs), but any change could benefit bighorn sheep by creating a more open habitat type.

Composition changes in the mixed shrub mountain type could result in slightly less preferred forage for mule deer, but this would not be significant. White-tailed deer, which apparently have a more diverse diet (Anthony and Smith 1977), could decrease if species diversity decreases. If more grasses and forbs are available, the loss of diversity could balance out.

The half shrub SHS has comparatively high pronghorn use (see Table 2-8). More forage would be available to pronghorn under the PA. Plant species diversity would increase, and there would be more forb production. Data on vegetation structure is conflicting; the highest shrub production was found on the fair condition class. However, it would be safe to predict less shrub cover on good condition sites. Low vegetation and openness are important components of preferred pronghorn habitat (Yoakum 1980).

The grass SHS's are important for big game, and some significant impacts would occur. Javelina use grass flats in high numbers, but most often where shrubs such as mesquite or sumac are found in these drainages. Under the PA, these shrubs would decrease, removing important food and cover for javelina. However, any decrease in shrub cover would improve these sites for pronghorn. A similar situation exists in the grass rolling upland SHS. However, in this SHS, shrub cover would not decrease significantly unless the site reaches good condition, and only 5 percent of the SHS would improve to good condition. The major impact would be increased forage for pronghorn.

Grass mountain, an important type for deer, javelina, and bighorn sheep, would decrease in shrub cover and plant diversity. In the good ecological condition class, only 6 percent shrub composition remains. This would probably be inadequate to provide food and cover for optimum deer and javelina numbers. Habitat for bighorn sheep would be improved, but only 5 percent would reach good condition. Ten percent would reach fair condition, and 63 percent would still be in fair condition, with shrub cover estimated at 15 percent.

While plant species diversity decreases with increasing condition, it still appears to be fairly high. This indicates that forage quality would be adequate to provide for big game needs.

In the pinyon-juniper grass type, an improvement in ecological condition would mean a large decrease in the percentage of shrubs. This SHS has the potential of 15-25 percent shrubs, with the major species being oak, mountain mahogany, sumac, and silktassel. Under the PA, 19 percent would reach fair condition, which would probably have at least 30 percent shrub, and the remainder, in poor condition, would still have a 50 percent shrub and tree composition. This change would result in a slight decline in shrub forage species, but would increase forb production which would benefit deer. The impact on deer would not be major because of this tradeoff.

In pseudoriparian, riparian, and oak draw SHS's, there also would be tradeoffs. Some forage would be lost because shrub composition would decrease. However, no quantitative data is available on how great these changes would be. More grasses and forbs would again be available in these SHS's, and this could provide a higher quality food source for deer and javelina, balancing out loss of shrubs.

Proposed water developments would result in more forage being available for big game because areas that are now too far from water would be used. It is assumed that all the forage around a new water would not be available to big game because cattle also would use the new waters and share the forage.

A number of new waters have been proposed in deer herd unit areas. Eleven of these are in areas which are 1 to 2 miles from the nearest existing water source. Deer would make more use of these areas. Production of forage preferred by deer is fairly low, averaging 2.4 pounds per acre in the area of these new waters. Although an increase in deer population would occur because of water developments, it would be small because of low forage production.

Four new umbrella catchments are proposed for bighorn sheep. This would ensure that they can find water in their preferred habitat. Another factor which would affect big game herds is a possibility of livestock animal unit month (AUM) adjustments where monitoring indicates competition between big game and cattle. No quantification is possible until completion of monitoring, but more forage could be made available to big game.

Threatened or Endangered Fauna Species

Proposed vegetation treatments, rangeland developments, and expected increases in condition classes would be beneficial for a number of threatened or endangered species in the long-term.

Eleven species (see Table 2-11) are associated with the riparian habitat of Guadalupe Canyon. New waters proposed for the grazing allotment in Guadalupe Canyon (Allotment 1512) would enable cattle to use forage in the hills away from the river canyon. This would improve the condition of the riparian area on which the 11 species depend by allowing for better ground cover, improved stand structure, and an increase in food plants.

Proposals to fence the riparian vegetation of the Gila River system and implementation of activity plans would allow for better grazing management and therefore, improved condition of the riparian areas. This would benefit 15 species associated with the area.

Four endangered species (see Table 2-11) are closely tied to grass habitats, and improvement of these grasslands is recommended by Hubbard (1979) as a conservation measure for the species. In the short-term, vegetation treatments would destroy some forage for these animals. In the long-term, vegetation treatments which would convert shrublands to grass types and improvement of existing SHS's would benefit these species. However, much of the known range of these animals is in the Playas and Animas Valleys where most of the land is in private ownership. The PA would only provide minor benefits to grassland-related species because of this land pattern.

Toxic Effects of Chemical Vegetation Treatments on Wildlife

Use of herbicides could potentially be toxic to wildlife in several ways: animals could be sprayed directly during herbicidal application, animals could forage on treated plants, or they could drink impounded waters contaminated by herbicides. Herbicide use would not be allowed close to rivers where contaminated runoff would reach the water source. Therefore, there would be no possibility of toxic effects on fish.

In the restricted area of a mesquite spraying project, rodents, reptiles, and some birds could have dermal exposure to chemicals used. Although at least one study (National Toxicology Program 1982) has shown dermal application of TCDD dioxin (a toxic by-product of 2,4,5-T) to produce cancer in mice, the amount and number of applications (about 300) were far higher than the amount of dioxin wildlife would be exposed to in an actual mesquite spraying. Therefore, it is difficult to assess the effects of dermal contact in a field situation, but in the literature reviewed, it was not mentioned as a problem.

Eating foliage of recently sprayed plants also could be potentially harmful to wildlife. Laboratory studies involving oral applications of 2,4,5-T show conflicting results. Since 2,4,5-T persists for less than 24 hours on vegetation, an animal would be unlikely to eat enough of it to be harmed. Studies generally show that it is eliminated soon after ingestion. Because 2,4,5-T is eliminated so quickly, there is little likelihood of it moving through the food chain. The Council for Agricultural Science and Technology reviewed information on phenoxys and concluded that 2,4,5-T, as used in this country, is not hazardous to animals (USDA-States-EPA 1979).

Dicamba and Picloram persist somewhat longer on foliage than does 2,4,5-T, but still break down fairly quickly. Little information is available on the toxic effects of these chemicals. The U.S. Department of Agriculture's Compilation of Registered Uses (1980) does not list any effects on wildlife. Areas to be treated are not high use areas for big game, so the possibility of ingesting any herbicides would be slight for big game animals.

Herbicide residues could be found in water impoundments because of runoff. However, 2,4,5-T disappears rapidly from impounded water, and only very small amounts accumulate there to start with. Picloram and Dicamba persist somewhat longer, but still would be gone in 45 days

(Scifres 1980). Spraying would not be allowed over or close to an impoundment. Any residues in the water would be very dilute, so no significant problems would occur. The literature reviewed did not give any information on breakdown products of herbicides.

Summary

Under the PA, bird and reptile diversities would increase, however, rodent diversities and biomass would decrease. There would be a better food source for game birds. The riparian SHS in particular would improve, and there would be a general improvement in most standard habitat sites. More forage and better quality habitat would be available for most big game, except javelina. The riparian SHS is the most significant habitat for threatened or endangered wildlife species, therefore, these species would benefit from improvement of this SHS. Either very minor or no toxic effects on wildlife would be expected from the use of herbicides.

No Action (NA) Alternative

Rangeland conditions would deteriorate in the long-term (see Chapter 3, Vegetation, No Action Alternative). Table 3-4 shows acres in each condition class. Comparing this to present conditions, 1,893 acres would go from excellent to good ecological condition; 16,711 acres from good to fair; and 153,439 acres from fair to poor.

Standard Habitat Sites (SHS's)

In creosote, mixed shrub and mesquite rolling uplands, and mesquite dunes, forb and grass cover would probably decline with shrubs becoming more dominant. Mesquite rolling upland is already predominantly in poor condition and would not change much. The other SHS's are in 30 to 78 percent fair condition, and the loss of wildlife foods could be significant. Upland game bird population, particularly scaled quail, would decline. Bird and reptile diversities would decrease. Rodent biomass would increase. The latter would probably cause raptor and predator population increases.

As ecological condition declines in mixed shrub mountain, grass mountain, and pinyon-juniper grass mountain, grass cover could decline. This could force livestock to use more shrub forage and put them into direct competition with wildlife. Again, upland game bird population would decline.

In the half shrub SHS and in grass sites in poor or fair condition, invasion of creosote, mesquite, and other undesirable shrubs would be likely. Bird diversities could increase because of the increased structural diversity, but if the site becomes shrublands rather than mixed types, bird diversities would decrease again. Rodents diversity and abundance would probably both increase. Effects on reptiles would vary by the amount of low-height cover that remained. Scaled quail populations would decrease with shrubland conversions because half shrub rolling upland and grass flats now have some of the highest populations.

In riparian sites, condition would continue to decline. Old trees would die and few of them would be replaced. In the long-term, salt cedar could invade areas now dominated by cottonwood, willow, and sycamore. The predominant vegetation would become salt cedar and mesquite. With this decline in structural diversity, bird diversity would also decrease. Nesting bird densities would decrease significantly. In 1981, 25 percent of reported nest sites were in cottonwoods and sycamores (BLM IHICS data). There would be less ground cover as sites declined in condition, and more sediment runoff would result. Water temperatures would rise with decreasing cover, changing the composition of the fish populations.

Pseudoriparian and oak draw sites are predominantly in poor condition with low structural diversity and little ground cover. There would not be much change in oak draw as 91 percent is already in poor ecological condition. Pseudoriparian, with 29 percent in fair condition, could decline further. Livestock could be forced to use shrubs more in these types and thus compete with big game.

Big Game

Big game would remain at present populations or decrease in numbers (see Table 3-9) partially because of competition with cattle. Forage quantity and quality would both decline. Mule deer could prevail over white-tails because mule deer are more successful than white-tails where cattle use is heavy (see Chapter 2, Wildlife). Pronghorn populations would decrease because of brush invasions. Bighorn sheep would be affected, but not as severely since cattle do not use much of the bighorn sheep habitat. Javelina would be the only big game animal whose food source would increase.

Threatened or Endangered Fauna Species

The two most valuable habitat types for endangered species are the riparian and grass sites. Declining condition of these sites would be detrimental to these species, which have become endangered because of the loss of suitable habitat.

Summary

Ecological condition would decline. The riparian SHS would deteriorate further. Forage would not be available for optimum big game numbers. Habitat for most endangered species would decline.

Maximization (MAX) of Livestock Forage Production Alternative

Standard Habitat Sites (SHS's)

Under the MAX Alternative, several SHS's would change because of mechanical and chemical vegetation treatments proposed. (See Table 3-10 for acres proposed for treatment by Standard Habitat Site.) Guidelines for vegetation treatments are contained in Appendix B-1.

TABLE 3-10

ACRES PROPOSED FOR VEGETATION TREATMENT BY STANDARD HABITAT SITE

	Mechanical	Chemical	
SHS	3-County Area	3-County Area	Dona Ana County[a/]
Creosote Rolling Upland	4,365	456,843	
Mixed Shrub Mountain		230	
Mixed Shrub Rolling Upland	735	17,094	
Half Shrub Rolling Upland	51	904	
Mesquite Rolling Upland	79	29,288	
Mesquite Sand Dunes		10,184	364,199

Source: BLM Las Cruces District Office Files, 1982.

Note: a/Creosote and mesquite treatment with Tebuthiuron and Dowco 290 in Dona Ana County were analyzed in the Grazing Environmental Impact Statement for the Southern Rio Grande Planning Area (USDI BLM 1981).

Treatments are expected to have a 40-60 percent kill rate on the target shrub. The effects on various plant species important to wildlife are covered under the PA in Chapter 3, Vegetation.

Bird diversities could increase in treatment areas. Many of the creosote and mesquite types are nearly monocultures at present. After treatment, plant diversity would increase in most cases, increasing bird diversity. However, there could be less shrub nesting birds on the site after treatment. If chemicals are used which kill yuccas and chollas, there would be a major decrease in nesting birds (see Table 2-9). Since yuccas and chollas are slow-growing, the loss would be long-term. In the short-term, the area could also be bare enough that very few birds would use the area.

Game birds could increase in the short-term because there would be a better food source and enough shrubs would remain for nest sites. In a study by Germano (1978), mourning dove and scaled and Gambel's quail were found in highest numbers in mesquite areas where strips had been cleared rather than in either undisturbed mesquite or mesquite-free sites. Long-term trends have not been thoroughly researched, but plant succession on treated areas may not favor scaled quail (Davis et al. 1975).

It is difficult to predict impacts to rodents. If the treatment results in good grass cover, rodent biomass could drop. Wood (1969) found the lowest rodent biomass in grassland types and highest in shrublands. If rodent biomass decreases, population of raptors and mammalian and reptilian predators would decrease. If a treatment results in improved plant diversity but not thick grass cover, rodent biomass could conceivably increase, and with it predator populations would increase.

Increased cover would result in an increase in reptile biomass (Jones 1981), however, some species could decrease. As mentioned above, there would be less rodents and thus, less prey for some snakes such as rattlesnakes and gopher snakes.

Big Game

Big game species would be affected in several ways by actions proposed under the MAX Alternative. Chemical treatments with 2,4,5-T would not remove much wildlife forage. Other chemical and mechanical treatments could cause a short-term loss of food sources for pronghorn. In the long-term, pronghorn forage would increase under any type of treatment. Treatment areas are not in mountainous areas so there would be little effect on ibex, desert bighorn sheep, and white-tailed deer. Although treatment areas do not overlap mule deer concentration areas, low numbers of mule deer are found in lowland SHS's. Deer forage would be lost in the short-term, but in the long-term, there would be an increase in species palatable to mule deer (forbs and some shrubs). Several plants preferred by javelina would decrease. Pricklypear is susceptible to Picloram. Mesquite pods, which are a food source for javelina, would be less available.

Another facet of these treatments is the change in vegetative structure. Lowering height structure makes former shrublands more useful to pronghorn. If openings are created by treatments (rather than complete shrub destruction), deer would make more use of the area.

Under the MAX Alternative, a number of rangeland developments are proposed, including 145 drinking troughs and 49 dirt tanks. In the 3-County Area, more water would be available to all wildlife. This would be particularly significant for big game, because unused forage could become available where it was previously too far from water to be utilized. Forty new waters are proposed for allotments which include portions of big game herd units.

Threatened or Endangered Fauna Species

Threatened or endangered wildlife species associated with grassland habitats (see Table 2-11) would benefit from vegetation treatments because there would be more grass cover in the long-term. However, there would be a loss of some forage and cover for several years after treatment. The Trans-Pecos ratsnake and the Gila monster would probably also benefit from the long-term increase in cover. Vegetation treatments would not have any detrimental effects on habitat for threatened or endangered wildlife species except for the short-term losses. There is a small possibility that some animals of low mobility, like the two above, could be accidentally killed during mechanical treatment.

Summary

Vegetation treatments would enhance habitat for pronghorn and mule deer. However, preferred javelina forage would decrease after these treatments. Treatments would be beneficial for endangered species associated with grasslands. Proposed drinking troughs and dirt tanks would provide more water for all wildlife and are especially important for deer.

Enhancement of Other Resource Values (EORV) Alternative

Under this alternative, the most improvement in the riparian SHS would occur. Grazing would not be allowed on any riparian areas because they are all in poor or fair condition. This would improve plant vigor, stand structure, and ground cover. As a result, more forage would be available for wildlife. Improvement in stand structure would provide habitat for more species. Fisheries habitat would be improved because there would be less sediment runoff and stream temperatures would be moderated by the overhanging vegetation.

Big game would have a better chance to rise to optimum numbers (see Table 3-9) because livestock reductions leave more and better quality forage for big game. Increases would occur not only in herd units, but areawide. Since livestock eat browse and forbs, reductions in livestock numbers would leave this food source available for wildlife.

Parts of eight dirt tanks are proposed for fencing under the EORV Alternative. If these are fenced, wildlife foods could be planted and more food and cover would then be available. In the localized areas of the tanks, this would increase game bird populations and bird nesting.

Elimination of Livestock Grazing (ELG) Alternative

Most SHS's would move toward their potential climax vegetation. In general, there would be more ground cover and more structural diversity. This would be significant in oak draw, riparian, pseudoriparian, pinyon-juniper, and mixed shrub mountain SHS's because all have a high percentage of area in poor condition, have low structural diversity (as expressed by high percentage of trees and shrubs), and are valuable for wildlife (high total number of vertebrate species and other indicators). On these sites, bird and reptile diversities would increase. Rodent diversities and biomass probably would decrease.

Creosote and mixed shrub rolling upland and mesquite SHS's would not reach their potential. On many sites, there is little seed source, other than shrubs, and little topsoil left. Improvement would not occur without treatment.

All forage produced would be available to wildlife (see Table 3-9). There would be more food available for game birds in the short-term, and their population would increase. In the long-term, a climax community would provide less food for game birds. Based on range inventory data from 1981-1982 and considering proper use factors, there would be enough forage for 2,865 deer, 16 pronghorn, and 940 bighorn sheep in big game herd areas. Although this amount of forage would be available to big game, other factors could prevent big game populations from reaching these numbers. Lack of water in some areas makes forage unavailable. Desert shrublands are often unsuitable for pronghorn and deer use because the vegetation is too tall or openings are lacking. Another factor is that climax vegetation is not always the best quality forage for big game. Better quality deer and pronghorn forage is found in earlier successional stages. White-tailed deer could increase more than mule deer since they appear to be more adapted to climax communities and may be socially intolerant of cattle (see Chapter 2, Wildlife).

Threatened or endangered wildlife species would benefit by habitat improvements on most important SHS's (riparian, pseudoriparian, and all grass sites). Baird's sparrow and McCown's longspur would particularly benefit from additional grass cover in the winter.

Areawide deer and pronghorn numbers also would increase, but exact numbers are difficult to predict. Pronghorn would not increase much because there would be no brush treatments.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

Several objectives of this proposed ACEC are intended to protect and improve riparian or aquatic habitat. Special management requirements that would impact wildlife are fencing for livestock management, a No Surface Occupancy designation for energy minerals leasing, withdrawal from locatable mineral entry, and an off-road vehicle closure.

Fencing to manage livestock would result in improved plant vigor, stand structure, and ground cover on the riparian vegetation. The vegetative changes would in turn improve the aquatic resource by reducing sedimentation, moderating water temperature, and providing overhanging cover on the river banks. This would impact more than 300 terrestrial species and 12 fish species that can be found in the Gila River Lower Box. Seven of the terrestrial and two of the fish species are either on Federal or state endangered lists.

The management requirements limiting development and human pressure would protect all wildlife from disturbance. This is particularly important for raptors, which are sensitive to human disturbance (Millsap 1981; Hubbard et al. 1979). Poaching and accidental wildlife deaths would also be minimized as would the possibility of contamination of the river from minerals activities.

Gila Middle Box Wildlife ACEC

Management objectives for the proposed ACEC are intended to maintain the aquatic and cliff habitats, the scenic and recreation values, and the water quality and quantity. Under the special management requirements, no new rights-of-way would be granted, a No Surface Occupancy stipulation would be placed on energy minerals leasing, and the ACEC would be closed to locatable mineral entry.

Maintaining the water quantity would have a beneficial impact on the loach minnow and spikedace, both state-endangered and Federal candidate species. Raptors and bats, which both use the cliffs, would be protected from harassment under the management restrictions. Denying rights-of-way would help maintain water flow in the Middle Box and this would sustain downstream riparian vegetation, including that of the Gila Lower Box. Riparian vegetation is adapted to and dependent on flooding (Bureau of Reclamation 1981).

Organ Mountains Scenic ACEC

Special management requirements for this ACEC deal with closures for plant collection, off-road vehicle use, energy minerals leasing, and locatable mineral entry. These restrictions would provide significant long-term protection and enhancement for mule deer habitat, as well as for habitat of all non-game species.

Geology and Mineral Resources

Energy Minerals

Proposed Action (PA)

Under the PA, new information on geology would be gained through seismic activities and exploratory drilling. The information gained would be available for a variety of studies and projections by government and private organizations, industry, and educational institutions as well as individuals.

Under this alternative, various mineral resources could be produced. Oil and gas and geothermal resources could be removed as well as caliche and sand and gravel which could be mined to provide surfacing material for access roads and drill pad construction. The loss of oil and gas and geothermal resources would be irretrievable, but the saleable minerals could occasionally be reused, if convenient to the operator.

Maximization (MAX) of Energy Minerals Leasing Alternative

Additional information on geology would become available on areas outside of the high potential sites.

Enhancement of Other Resource Values (EORV) Alternative

Since less acreage would be permitted for seismic activities or exploration drilling, less information would be gained for geologic studies for industry, the general public, and for various governments. Under the EORV Alternative, less mineral materials would be produced than the existing situation.

Proposed Special Designation Areas

Proposed Action (PA)

Organ Mountains Scenic ACEC

Locatable and saleable minerals could not be mined if the Organ Mountains Scenic ACEC is designated because minerals would be withdrawn under the General Mining Laws. Locatables are quite abundant, but mining claims with valid existing rights and leasable minerals would not be affected. The effect on leasable minerals would be minimal due to poor potential for an occurrence of either oil and gas or geothermal energy resources.

Livestock Grazing

Energy Minerals

Proposed Action (PA)

Under the PA in the short-term, oil and gas and geothermal activities (including exploration drilling, access roads, geophysical exploration, and shallow temperature gradient holes) on 14,638 acres would have an insignificant impact on livestock grazing, even if concentrated on one or two allotments. AUMs lost as a result of vegetation that is disturbed or destroyed would be minimal, causing little impact to livestock grazing.

In the long-term, impacts to livestock grazing would be insignificant for the same reasons as in the short-term. Oil and gas and geothermal activities would disturb 32,692 acres, but would be an insignificant AUM loss.

Cattle could be disturbed and normal grazing patterns slightly disrupted, but this would be a minor inconvenience in the short- and long-term. Water discovered during drilling activities could be used by livestock.

Rangeland Management

Proposed Action (PA)

Under the PA, 262 allotments would be grazed. Twenty-five additional parcels of public land, comprising 7,663 acres, would remain unallotted.

Seventy-one allotments and parts of 10 other allotments in Category I cover 1,120,827 acres or 69 percent of the public land in the 3-County Area. Allotments in Category I are shown in Appendix F-2.

Intensive management in areas with resource conflicts (riparian areas, ACECs, known herd units, and threatened or endangered species) could have a significant impact depending on the management scheme chosen. Production practices, types of operations, periods of use, and classes of livestock could all be affected. In the short-term, livestock grazing use would be adjusted by allotment based on utilization studies and actual grazing use. For analysis purposes, livestock grazing would be reduced 35 percent on acres in poor ecological condition and 20 percent on acres in fair ecological condition. Using the worst case analysis, initial adjustments on Category I allotments would be 22 percent or 39,697 AUMs below preference. These AUMs would be held in suspended preference.

Yearlong grazing, a common method of livestock management in the semiarid desert rangeland region, would continue in the short-term. Semiarid rangelands traditionally have been grazed yearlong and research shows that these rangelands can be grazed at any time of year without serious detriment if the intensity of grazing is not severe and periods of grazing alternate with suitable periods of rest. The primary shortcomings of continuous yearlong grazing is that it leads to excessive use in areas of cattle concentration and wasted forage where cattle rarely graze. Favorite plants and areas of a pasture are regrazed first each summer, thereby keeping them in a state of lower condition (Martin 1975 and 1978). Systems such as rest during alternate years do not provide enough recovery time for grasses to regain vigor, seed, and establish new seedlings (Arizona Interagency Range Committee 1973 [1974]). Possible grazing management treatments that could be used on these Category I allotments are found in the Agricultural Experiment Station Research Report 467, Characteristics of Grazing Systems (Gray et al. 1982).

Chemical treatment of creosote and mesquite would occur on 51,888 acres of public land. There would be a 4,447 AUM increase on eight allotments in the 3-County Area after treatment. Allotments with acres of vegetation treatment and increased AUMs are shown in Table 1-7. Livestock grazing on these treated areas would be excluded for a minimum of two growing seasons to give perennial forage a chance to reestablish. In the long-term, the increased forage production on these allotments would offset reduced grazing use during the deferment. With improved ecological condition and increased perennial forage, ground cover would also increase.

Monitoring studies, including rangeland condition and trend, utilization patterns, actual use, and precipitation records would be used to evaluate and make adjustments in livestock numbers. Adjustments in livestock use would be based on forage production and upward or downward trends in rangeland condition. Permittees would be involved in all aspects of developing grazing management plans.

In the long-term (2010), projected livestock AUMs would increase 2.5 percent or 4,419 AUMs above preference on Category I allotments. Proposed rangeland developments would be implemented first on these Category I allotments on a priority basis (see Appendix F-4). New rangeland developments would redistribute grazing use and relieve grazing pressure around existing developments in the short-term. Presently severe or heavily used areas would show improvement in the long-term.

One hundred and sixty-four allotments and parts of six other allotments in Category M cover 447,210 acres or 27 percent of the public land in the 3-County Area. Allotments in Category M are shown in Appendix F-2. No change in management would be proposed on these allotments since they are in satisfactory or better ecological condition. Forage production could increase, but probably not enough in the long-term to warrant increased livestock numbers. The 5-year average licensed use was used for the short- and long-term AUM projections since management objectives or goals are not proposed. Proposed rangeland developments could be implemented dependent upon funding and priorities on the Category M allotments (see Appendix F-4). Impacts from the proposed rangeland developments would be the same as discussed under the Category I allotments.

Seventeen allotments and parts of four other allotments in Category C cover 68,366 acres or 4 percent of the public land in the 3-County Area. Allotments in Category C are shown in Appendix F-2. No change in management would be proposed on these allotments. The 5-year average licensed use was used for the short- and long-term AUM projections since management objectives or goals are not proposed. Proposed rangeland developments could be implemented dependent upon funding and priorities on the Category C allotments (see Appendix F-4). Impacts from the proposed rangeland developments would be the same as discussed under the Category I allotments.

Category M and C allotments would maintain their present 5-year average licensed use of 75,871 AUMs in the short- and long-term. However, these allotments could be grazed to preference (87,132 AUMs).

Acres in each ecological condition class by allotment used in categorizing I, M, and C allotments are shown in Appendix F-6. Criteria for categorizing allotments are shown in Appendix F-3 with more detailed explanations in Technical Report VIII. Long-term AUM projections (2010), 5-year average licensed use, and preference by allotment for all allotments are listed in Appendix F-1.

Overall projections on all allotments show a short-term reduction in livestock AUMs of 50,958 or 19 percent below the grazing preference. These AUMs would be held in suspended preference and could be restored, depending on changes in the vegetative resource as a result of rangeland developments and vegetation treatments. In the long-term, 257,402 AUMs would be available for livestock use. This would be a decrease of 6,842 AUMs or 2.6 percent below preference.

Summary

Under the PA, of the 262 allotments in the 3-County Area, 71 allotments or 69 percent would be in Category I, 164 allotments or 27 percent in Category M, and 17 allotments or 4 percent in Category C, with 10 allotments placed partly in I and the rest in M or C.

Using the worst case analysis, initial livestock reductions on Category I allotments in the short-term would be 22 percent or 39,697 AUMs below preference. These AUMs would be held in suspended preference. Vegetation treatments on 51,888 acres would increase 4,447 AUMs on eight allotments. In the long-term, proposed vegetation treatments, grazing management treatments, and rangeland developments on these allotments would increase AUMs by 2.5 percent or 4,419 AUMs above preference.

Category M and C allotments would maintain their present 5-year average licensed use of 75,871 AUMs in the short- and long-term. However, these allotments could be grazed to preference (87,132 AUMs).

In the short-term, livestock reductions for allotments in all categories would be 19 percent or 50,958 AUMs below preference. In the long-term, AUMs would decrease by 2.6 percent or 6,842 AUMs from preference to 257,402 AUMs.

No Action (NA) Alternative

Under the NA Alternative, livestock grazing management and grazing use would remain unchanged. The existing Allotment Management Plan (AMPs) implemented on 15 allotments would continue under intensive management with the remaining 247 allotments grazed yearlong. Grazing preference (264,244 AUMs) would remain unchanged in the short- and long-term, although actual numbers grazed would approximate the 5-year average of 227,031 AUMs. New grazing treatments would not be developed or implemented. Rangeland developments and vegetation treatments initiated from Range Betterment Funds would continue to be used as at present.

In the long-term, livestock grazing use under this alternative would decrease due to increased deterioration of rangeland condition, trend, and perennial forage production. Deterioration would be gradual, however, impacts from reduced livestock numbers could eventually be significant.

Since southern New Mexico vegetation patterns have changed significantly within the last 100 years, it is assumed that present patterns would continue changing to brush dominated areas without some vegetation treatment. Desirable perennial forage species would have a small chance for recovery (Beck 1982; Herbel 1982; York and Dick-Peddie 1969; and Norton 1981).

Maximization (MAX) of Livestock Forage Production Alternative

Under the MAX Alternative, I, M, and C management categories would apply. Short-term reductions from preference to 213,286 AUMs would remain the same as the PA. Impacts from proposed rangeland developments would be the same as discussed under the PA (see Appendix F-5). Vegetation treatments (chemical and mechanical) have been proposed on 880,997 acres of creosote, mesquite, tarbush, and mixed desert shrub. There would be a 100,945 AUM increase on 116 allotments in the Resource Area after treatment. Allotments with acres of vegetation treatment and increased AUMs are shown in Table 1-8. Livestock grazing on these treated areas in the short-term would be excluded for a minimum of two growing seasons to give perennial forage a chance to reestablish. The increased forage production in the long-term would offset reduced grazing use during the deferment. With improved ecological condition and increased perennial forage species, ground cover would also increase.

In the long-term, due to increased numbers of rangeland developments and acres of vegetation treatments, anticipated forage response would provide for 33,521 AUMs above preference (264,244). Projected grazing use in 2010 would be 297,765 AUMs or a 13 percent increase above preference.

Rangeland monitoring studies would determine the grazing capacity over the long-term. The impacts of implementing the vegetation treatments and management actions are the same as those described under the PA, but would be of greater magnitude. Allotments receiving vegetation treatments or additional rangeland developments would be placed in Category I.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative, I, M, and C management categories would apply. Impacts from proposed rangeland developments (which include an additional 7.75 miles of fence [see Table 1-9]) would be the same as those discussed under the PA. The short-term impacts would be more severe than under the PA, constituting a reduction of 41 percent or 108,925 AUMs below preference. For analysis purposes, livestock grazing use would be decreased on all allotments with areas in fair (25 percent) and poor (50 percent) ecological condition and eliminated on riparian areas and watersheds in critical or severe erosion classes. Because of the elimination of grazing on these areas, two allotments (Donaldson 1016 and Johns 1028) would lose their grazing privileges on public land. Parts of seven other allotments would also lose some grazing preference (see Table 1-9). In the short-term, because of this reduction, vegetation would respond initially but would not return to full grazing numbers in the long-term due to weather factors and increased brush encroachment (Herbel 1982 and Beck 1982). In the long-term, there would be an AUM decrease of 35,714 or 13.5 percent below the preference to 228,530 AUMs.

Elimination of Livestock Grazing (ELG) Alternative

Under the ELG Alternative, all livestock would be removed from public land in the 3-County Area. No grazing permits or leases would be issued and all AMPs would be cancelled. New rangeland developments would not be constructed for livestock use and existing rangeland developments would be either removed, abandoned, or maintained for other resources. Many livestock operators would be forced to liquidate, disperse their livestock, or obtain other lands for grazing to remain in business. All forage production would be available for other resources.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

The Gila River and part of the adjacent creosote breaks and grass hills would be fenced so that livestock could be managed. This could have a significant effect on the Caprock allotment (1078), restricting the movement of cattle from one pasture to another. There would be a loss of approximately 5 percent or 242 AUMs for seven months of each year on this allotment.

Gila Middle Box Wildlife ACEC

Livestock grazing would not be impacted since cattle cannot use the canyon.

Organ Mountains Scenic ACEC

Management of the Organ Mountains Scenic ACEC would not significantly impact livestock grazing except that special stipulations could be made on a proposed spring development on the San Augustine allotment (5003) on the east side of the Organ Mountains. Mining activity would not reduce AUMs and in many cases, would occur on steep slopes unsuitable for livestock grazing.

Water Resources

Energy Minerals

Proposed Action (PA)

Surface disturbing activities associated with oil and gas and geothermal development (which include geophysical exploration, access roads, exploratory drilling, and production wells) could increase the amount of sediment entering surface water. Sediment yield is determined partly from the rate of soil erosion and also by particle size, distance to water, and intensity of rainfall. Under arid and semiarid conditions, most sediment generated does not immediately reach live water (perennial streams), but is deposited in ephemeral drainages where it may remain until an unusually heavy rainfall event occurs.

Energy minerals development would not be a major contributor of sediment yield in perennial streams in the Resource Area. This is due in part to a vast majority of the Resource Area being within a series of closed basins that do not contribute surface water to any regional river basin, and partly to location and construction stipulations placed on surface disturbing activities near perennial streams.

The most significant impact from increased sediment would be site-specific and would involve stockponds and reservoirs in ephemeral drainages directly downstream from the area disturbed. Surface runoff would increase locally and transport additional sediment. The life expectancy of the watering facilities would be shortened as a result of the increased sediment. The impact from sedimentation would be greatest from established oil and gas or geothermal production fields where a concentration of surface disturbance from various activities occur.

The chemical quality of surface water could be affected if oil or fluids containing toxic materials are spilled. Most spills are a result of pipeline leaks or ruptures. Additionally, if a reserve pit ruptures, leaks, or overflows the fluid could be carried into ephemeral drainages and eventually contaminate live water. The potential for chemical contamination of perennial water in the Resource Area is low because of the predominance of closed basins. Site-specific damage to stockponds and reservoirs in ephemeral drainages would be effectively reduced with location and construction stipulations.

Water discharged on the surface from oil and gas and geothermal operations must be permitted by and meet standards set by the State of New Mexico Oil Conservation Division. The impact of such authorized discharges on surface water would be minimal.

Groundwater from wells in the Resource Area is the primary source of water for domestic, commercial, and livestock use. Impacts to groundwater from oil and gas and geothermal operations are the mixing of water from different aquifers and the leakage of toxic materials into shallow aquifers during drilling operations. Regulations set by the State of New Mexico Oil Conservation Division require that all fresh waters and waters of present or probable value for domestic, commercial, or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Division. Failures or leaks would rarely occur, therefore, no significant impact would occur.

Discharge of waste water by underground injection methods must be permitted by and meet standards set by the State of New Mexico Oil Conservation Division. The Division has been given primary underground injection control under the Safe Drinking Water Act. The impact of such authorized discharges on groundwater supplies would be minimal.

Water needed for drilling operations would generally be obtained from groundwater sources. In some cases, new water wells would have to be drilled for the needed water. Water use permits are required by New Mexico law for declared groundwater basins and are issued by the State Engineer's Office, thus ensuring that existing water appropriations are protected. The amount of water needed by the oil and gas or geothermal industry would remain low, 45 acre-feet in the short-term and 120 acre-feet in the long-term, and have little effect on total supply.

Specific areas in the LCLRA that would have special stipulations as part of energy minerals leasing include areas along the Gila River and important wetland/riparian areas: San Simon Cienega, Hadley Draw, and Guadalupe Canyon (see Table 1-2). The special stipulations would minimize surface disturbance in these areas and limit the risk of spills and contamination of perennial waters. Impacts such as increased sediment yield or chemical pollution would be minimal.

Summary

Under the PA, increases in sediment yield would be site-specific and involve stockponds and reservoirs in ephemeral drainages. The greatest impact would be from established oil and gas or geothermal production fields. Impacts to surface water and groundwater quality would be minimal when standard operating procedures are followed. Water consumption by the oil and gas or geothermal industry would have little effect on total supply.

No Action (NA) Alternative

Impacts to surface water and groundwater quality would be minimal when standard operating procedures are followed. Water consumption by the oil and gas or geothermal industry would have little effect on total supply. The amount of water needed by the oil and gas and geothermal industry would be the same as discussed under the PA.

Maximization (MAX) of Energy Minerals Leasing Alternative

Since the entire Resource Area would be opened to energy minerals leasing, the impacts as described under the PA would apply to the additional acreage, however, because of the increased open acres the impacts to water quality would be greater. Designated areas with special stipulations as shown on Table 1-2 would now be open to development. This would include the Gila River Valley along with several wetland/riparian areas (Guadalupe Canyon, Hadley Draw, and San Simon Cienega). Energy minerals exploration and development in these areas without special stipulations would increase slightly the sediment yields and the risk of spills and contamination of perennial waters. The amount of water needed by the oil and gas and geothermal industry would be the same as discussed under the PA.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative, areas described as not open to leasing (NOL) under the PA, that have hydrological impacts, would remain NOL, and impacts would be the same as those described under the PA. To enhance other resource values, special stipulations would be attached to leases (see Table 1-2). Riparian areas along the Gila River, Hadley Draw and the San Simon Cienega would be protected with a NSO stipulation. This would serve to maintain the hydrologic functions of the riparian areas and limit the risk of surface water contamination.

The remainder of the LCLRA would be open to energy minerals leasing with standard and special stipulations. Impacts to water quality would be the same as those described under the PA. The amount of water needed by the oil and gas and geothermal industry would be the same as discussed under the PA.

Rangeland Management

Proposed Action (PA)

Management changes on Category I allotments would result in an increase of both production and ground cover of desirable and intermediate forage species. Consequently, surface runoff volumes would decrease an average of 7 percent in the long-term on mixed shrub grass watersheds of the hills, malpais, limy, draw, and loamy range sites (633,005 acres) where vegetative cover increases a minimum of 5 percent. On watersheds dominated by desert shrub vegetation with gravelly and gravelly loam range sites, runoff volumes would not change because of the small change in ground cover. Runoff would not change on areas of the sandy, deep sand, bottomland, clayey, or salt flats range sites because of fairly level slopes and rapid infiltration of sandy soils.

On areas where runoff is reduced, surface water quality would improve slightly because of the lower amounts of suspended sediment and dissolved solids transported by runoff water. A reduction in runoff volume would also improve on-site utilization of water. These improvements would be localized and cannot be quantified.

Construction of rangeland developments would cause local disturbance on 344 acres in the short-term and 71 acres in the long-term which would temporarily increase runoff and sediment yield until ground cover becomes reestablished. These local areas of disturbances would not cause a significant change in total runoff or sediment yield from any particular watershed. Minor impacts would result as the anticipated increase in vegetative cover would locally improve infiltration rates and site conditions. Additionally, construction of 68 erosion dikes would stabilize local watersheds.

Herbicide application for control of mesquite and creosote presents a potential for polluting water resources in the LCLRA. Mobility and degradation rate of herbicides in an ecosystem are important factors when considering water contamination. Several processes of degradation could take place once the herbicide is applied and are described in the Chapter 3, Soils. Mobility is largely associated with the type of herbicide and the extent of solubility, as well as environmental factors. The interaction of degradation rate and mobility determine the potential for water contamination. Herbicides could enter surface water indirectly through subsurface and overland flow, and through direct application or drift.

Entry to surface water via subsurface flow depends on mobility of the herbicide in the soil and available subsurface water. On a relative scale, Picloram is the most mobile of the sprayed herbicides followed by Dowco 290, Dicamba, and 2,4,5-T. All except Dowco 290 are absorbed in relatively low amounts, and the amount absorbed was inversely related to the water solubilities of the acidic compounds (USDA, EPA 1979). Further studies are needed to determine soil leaching characteristics of Dowco 290 under different field conditions (Dow Chemical n.d.). Tebuthiuron, once it is in the soil, is taken up by plant roots and some may become absorbed on soil particles. Only small amounts are expected to be leached. Some movement of Picloram, Dicamba, and 2,4,5-T would be expected in the subsurface water. Available information indicates that herbicide residue is largely retained in the upper layer of soil with small lateral movement. Somewhat deeper movement of the herbicide would be expected in course sandy soil with low organic matter content. Relatively high concentrations would be found in the soil following application, but residues decline rapidly to low concentrations (Merkle et al. 1967; Bovey and Scifres 1971; Altom and Stritzke 1973; Lutz 1973; Currier et al. 1972; Norris and Montgomery 1975; Scifres et al. 1977; Norris et al. 1977; Plumb et al. 1977; Fryer et al. 1979; Johnsen 1980). Leaching does not appear to be an important process for transporting significant quantities of herbicides based in part on the low availability of residues, and on the low significance of subsurface flow in arid conditions where ephemeral stream systems dominate with low rainfall and a high evaporation rate.

Entry to surface water via overland flow is governed primarily by solubility of the herbicide, time lapse from application to the first rain, rate of application, and runoff characteristics. A wide range of investigations have shown that Dicamba, Picloram, and 2,4,5-T are relatively water soluble thus having a potential for transport in overland flow. The data consistently show that highest concentrations are transported during periods of intense precipitation immediately following application of the herbicide. Concentration decreases rapidly with each subsequent runoff event (Bovey and Scifres 1971; Currier et al. 1972; Bovey et al. 1974; Norris and Montgomery 1975; Norris et al. 1977; Plumb et al. 1977; Bovey et al. 1978; Johnsen 1980). Research presented by Bovey and Scifres (1971) and Bovey et al. (1980) indicated that a time lapse of one month or longer between application and the first major runoff event resulted in significantly lower initial concentrations of 2,4,5-T and Picloram. The short-term, initial low-level contamination of herbicides following the first major runoff is subject to further degradation by microorganisms, photodecomposition, and dilution that would lower overall concentrations. However, in arid regions with localized storms, the concentrations may not be reduced through downstream dilutions (Johnsen 1980). Bovey et al. (1980) found similar results with Tebuthiuron in overland flow. There was an initial low-level concentration in the first runoff that decreased rapidly with following runoff events. The amount of Tebuthiuron transported is likely associated with the amount of sediment yield. Characteristics of Dowco 290 in overland flow have not been documented (Dow Chemical 1980).

Surface water contamination from herbicide application via overland flow would be minimal. Application procedures that follow the guidelines for vegetation treatments (see Appendix B-1) would reduce the chance of accidental spills and possible water contamination. Peak concentrations of herbicides would vary according to length of time between application and first rain, but would be low because application would not coincide with major runoff events and the herbicides would undergo further degradation. Additionally, short-term concentrations would be localized because the treatment areas are within closed basins and drained by ephemeral stream systems, and because of the dispersed character of the treatment areas over time.

Direct application or drift of aerially applied herbicides to surface waters represents the greatest potential for contamination. Available information shows that maximum concentrations in streams and impounded waters occurred during or shortly after application. Concentrations decrease rapidly due primarily to dilution, photodecomposition, and absorption on bottom sediments. Buffer strips have proven effective to minimize direct application and drift to surface water. Time required to return to nondetectable levels varied according to the nature of the area treated and concentration of the herbicide (USDA, EPA 1979; USDA 1973; Bovey and Scifres 1971; Currier et al. 1972; Plumb et al. 1977). Characteristics of Dowco 290 and Tebuthiuron in streams and impounded water are not available. Surface water contamination due to direct application or drift of herbicides does not appear to be a significant impact due in part to stipulations that call for buffer strips and carefully controlled application near surface water impoundments, and because no treatments are planned near perennial streams, floodplains, or riparian areas.

Contamination of groundwater resources from herbicide application is associated with their leachability in the soil profile. As stated in Chapter 3, Soils, leaching does not appear to be an important process for transporting significant quantities of herbicides. In several studies (Bovey et al. 1975 and 1978; Bovey and Scifres 1971), where groundwater was sampled following treatments with 2,4,5-T and Picloram, very low concentrations or no detection were found in local seeps and shallow wells from the treated area. Further studies are needed to determine soil leaching characteristics of Dowco 290 under different field conditions (Dow Chemical n.d.). Depth to water in the proposed vegetation treatment areas varies from 50 feet to over 200 feet. The main potential for groundwater contamination would be in shallow wells (less than 100 feet) drilled in the alluvial deposits on piedmont slopes, and in the channel deposits of major arroyos, where significant recharge occurs locally. These situations would be limited in the proposed treatment areas and buffer strips would effectively reduce impacts to water quality where these conditions did exist. The possibility of herbicide contamination of groundwater supplies in significant amounts is remote because of their relatively slow rate of movement in soil, rapid biological and photo detoxification, and stipulations that control application near major drainages (see Appendix B-1, Guidelines for Vegetation Treatments).

Chemical treatments on 42,279 acres of creosote on gravelly, loamy, and limy range sites would increase surface runoff volume an average of 9 percent on the treated areas for 2 to 3 years following the treatments until vegetation becomes reestablished. In the long-term, however, runoff volume would decrease an average of 18 percent. This reduction in runoff would improve on-site utilization of water, and lower amounts of suspended sediment and dissolved solids transported by runoff water.

Chemical treatments on 9,609 acres of mesquite on sandy range sites would not significantly affect surface runoff because of nearly level slopes and rapid infiltration rates of the sandy textured soils. On-site utilization of water would improve in the long-term.

Consumptive water use by livestock and big game would be 261 acre-feet per year in the short-term and 316 acre-feet per year in the long-term which would be a 10 percent increase in water presently consumed. Approximately 60 percent of the water consumption by the year 2010 would be from groundwater sources. Total water depletion in the long-term would be 1,210 acre-feet, which would be an irretrievable loss of the resource. Stockpond evaporation would be 825 acre-feet per year in the short-term and 894 acre-feet per year in the long-term.

Summary

Under the PA, surface runoff volumes would decrease 0 to 18 percent depending on soil and vegetation types, ground cover, slope, and intensity of storms within the watershed. The possibility of herbicide contamination of surface water and groundwater supplies in significant amounts would be minimal when standard operating procedures are followed. Water consumption by livestock and big game would increase by 10 percent by the year 2010. Stockpond evaporation would be 825 acre-feet per year in the short-term and 894 acre-feet per year in the long-term.

No Action (NA) Alternative

Under the NA Alternative, rangeland developments and vegetation treatments would continue as at present. No significant changes, from the existing situation, in surface or groundwater resources would occur.

Maximization (MAX) of Livestock Forage Production Alternative

The MAX Alternative proposes chemical vegetation treatments on 875,767 acres presently dominated by mesquite and creosote. Chemical treatments would be conducted using the same herbicides and guidelines as discussed under the PA. The potential for contamination of water resources would be increased because of the additional acres to be treated. Water quality would decrease slightly.

Chemical treatments on 462,816 acres of creosote on the gravelly, loamy, limy, and gravelly loam range sites, would increase runoff volume an average of 9 percent on the treated areas for 2 to 3 years following the treatments. In the long-term, however, runoff volume would decrease an average of 18 percent. This reduction in runoff would improve on-site utilization of water, and lower amounts of suspended sediment and dissolved solids transported by runoff water.

Chemical treatments on 412,951 acres of mesquite on sandy and deep sand range sites would not significantly affect runoff rates because of nearly level slopes and rapid infiltration rates. On-site utilization of water would improve in the long-term.

Mechanical treatments on 5,230 acres of creosote, tarbush, and mixed desert shrub on gravelly loam range sites would not significantly affect surface runoff in the short-term because of nearly level slopes and use of vegetative mulch on the disturbed area. In the long-term, runoff volume would decrease an average of 13 percent.

Consumptive water use by livestock and big game would be 261 acre-feet per year in the short-term and 365 acre-feet in the long-term which would be a 20 percent increase in water presently consumed. Approximately 60 percent of the water consumption by the year 2010 would be from groundwater sources. Total water depletion in the long-term would be 1,325 acre-feet, which would be an irretrievable loss of the resource. Stockpond evaporation would be 825 acre-feet per year in the short-term and 960 acre-feet in the long-term.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative, surface runoff volumes would decrease an average of 8 percent in the long-term on mixed shrub grass watersheds of the hills, gravelly loam, draw, loamy, limy, and malpais range sites (681,176 acres) where vegetative cover increases a minimum of 5 percent. On watersheds dominated by desert shrub vegetation and a gravelly range site, runoff volumes would not change because of the small change in ground cover. Runoff would not change on areas of the sandy, deep sand, bottomland, clayey, or salt flats range sites because of level slopes and rapid infiltration rates of sandy soils. On-site utilization of water would improve in the long-term.

A 50 percent reduction of livestock on 499,614 acres in poor rangeland ecological condition and a 25 percent reduction on 828,980 acres in fair condition would improve watershed conditions. In the long-term, there would be better infiltration, improved on-site utilization of water, and reduced surface runoff volumes.

Elimination of livestock grazing on 1,004 acres of riparian habitat would improve the hydrologic functions of these wetland areas. There would be an increase in water storage, improved groundwater recharge, and improved channel stability. Part of these acres (584) are also included in the fencing of watersheds in critical or severe erosion classes.

Elimination of livestock grazing on 12,501 acres of watershed in critical or severe erosion classes would decrease runoff slightly and improve infiltration rates in the long-term. As a result of reduced runoff, there would be a decrease in the amount of sediment and dissolved solids transported to the Gila River.

Impacts from chemical vegetation treatment would be the same as under the PA, which includes a reduction in runoff in the long-term on 42,279 acres.

Consumptive water use by livestock and big game would be 191 acre-feet per year in the short-term and 281 acre-feet in the long-term which would be a 1 percent increase in water presently consumed. Approximately 60 percent of the water consumption by the year 2010 would be from groundwater sources. Total water depletion in the long-term would be 1,175 acre-feet, which would be an irretrievable loss of the resource. Stockpond evaporation would be 825 acre-feet per year in the short-term and 894 acre-feet per year in the long-term.

Elimination of Livestock Grazing (ELG) Alternative

Under the ELG Alternative, surface runoff volumes on grass and mountain shrub watersheds would decrease an average of 8 percent in the long-term on hills, gravelly loam, loamy, limy, breaks, malpais, and draw range sites (709,609 acres) where vegetative cover increases a minimum of 5 percent. On watersheds which include bottomland, clayey, gravelly, sandy, and salt flat range sites, runoff volumes would decrease minimally due to small changes in ground cover on level or nearly level slopes, and rapid infiltration in sandy areas.

Reduced runoff would cause a decrease in dissolved solids and suspended sediments that would otherwise be transported by runoff water, however, amounts cannot be quantified at this time. Surface water quality would also improve through decreases in stream bank (which include riparian/floodplain areas) erosion and reduced fecal coliform count. As ungrazed areas improve and runoff decreases, both overland flow velocities and quantities would be reduced, peak discharge would be lowered, and on-site utilization of water improved. Groundwater quality would not be affected under this alternative.

Under the ELG Alternative, water consumption of 277 acre-feet per year by livestock would be eliminated, while wildlife would continue to consume 3 acre-feet per year in the long-term. Total water depletion in the long-term would be 828 acre-feet, which would be an irretrievable loss of the resource. Stockpond evaporation would not be a quantifiable change from the existing situation.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

Improvement of riparian habitat and controlled grazing management would serve to stabilize the stream channel through the Lower Box, thus reducing channel erosion and lowering sediment yield downstream. Improved riparian vegetation would also contribute to enhancement of the hydrologic functions of surface water storage and groundwater recharge.

Gila Middle Box Wildlife ACEC

Limiting surface disturbing activities would serve to maintain water quality in the Gila River for designated uses that include coldwater fisheries and secondary contact recreation.

Organ Mountains Scenic ACEC

Restrictions on surface disturbing activities would provide long-term protection for existing watershed conditions.

Air Quality

Energy Minerals

Proposed Action (PA)

Air quality conditions would be affected by oil and gas and geothermal operations, beginning with the activities involved in exploration and continuing through both development and production. Construction of access roads and drilling pads would introduce dust particles into the air especially when windy conditions prevail. However, the initial disturbance of the surface (through movement and other use of equipment during exploration operations) would be minor compared to use of these roads by the general public for hunting, fishing, rockhounding, and use of off-road vehicles (ORVs) such as motorcycles, jeeps, and dune buggies. At present, there are no available quantitative data related to the amount of dust particles being produced in a specific area during a specific time period. Data are also needed which concerns the fallout patterns of dust particles and their effect on the surrounding environment.

While air quality would be affected on a broad scale by the oil and gas and geothermal industries during periods of exploration, pollution becomes much more concentrated during the development stages. Also, if the new oil and gas or geothermal developments are located on the windward side of a community, the effects of dust particles would become more noticeable. As oil and gas and geothermal exploration operations progress into the development and production phases, accidents such as explosions, fires, and blowouts could affect air quality.

Rangeland Management

Proposed Action (PA)

Under the PA, construction of rangeland developments and vegetation treatments would result in localized generation of dust during operations. The addition of these particulates to the air would be of short duration and would have minimal impacts on the air quality of the 3-County Area. Until vegetation is reestablished on these areas, there would be localized, short-term impacts resulting from dust being blown into the air during periods of high velocity winds, especially during the spring months.

Only Federal and state registered herbicides would be used for chemical vegetation treatments. The use of herbicides in granular form would not affect air quality. The use of liquid sprays would have minimal short-term, localized effects on air quality. Liquid herbicides are generally available in three kinds of formulations: esters, low volatile esters, and amine salt formulations. Esters have the greatest tendency to volatilize and drift when used in spray applications. However, under the PA, only low volatile esters or amine salt formulations would be used.

The hazard of herbicide drifting during aerial spray applications would be dependent upon weather conditions, the distance droplets must fall, and the size of the droplets. Volatility rates would be dependent mostly on droplet size and air temperature. Generally, spray droplets less than 200 microns tend to volatilize faster than larger droplets.

The vegetation treatment guidelines would significantly reduce volatilization and drift when aerial spray applications occur under the following conditions: air temperature is less than 85°F, wind velocity is less than 7 mph, precipitation is not imminent, application is at 50 feet or less above the ground, droplet size is greater than 200 microns, and aircraft speed is less than 100 mph. (See Appendix B-1 for vegetation treatment guidelines.)

The amount of herbicide drift and volatilization which would be considered as having significant effects on the atmosphere would be difficult to estimate. However, the proposed herbicide applications for control of vegetation would be expected to have only localized, short-term impacts on the air quality in relatively isolated regions of the 3-County Area.

No Action (NA) Alternative

Impacts to air quality would be the same as the existing situation.

Maximization (MAX) of Livestock Forage Production Alternative

Under this alternative, the number of acres proposed for vegetation treatment (880,997 acres) and rangeland developments would be greater, resulting in higher concentrations of dust and herbicides being added to the air. The impacts, however, would remain localized and of short duration and would not significantly affect the air quality of the Resource Area

Elimination of Livestock Grazing (ELG) Alternative

Impacts to air quality resulting from the elimination of livestock grazing would remain essentially the same as those that exist now. Pollutants would include carbon monoxide from automobiles, sulfur dioxide from smelters and other industries burning fossil fuels, and blowing dust.

Cultural Resources

Energy Minerals

Proposed Action (PA)

The primary impact to cultural resources would occur during the exploration and development stages from surface disturbing activities. Currently, seismic operations on public land are surveyed for cultural resources at the same time the land surveyors lay out the seismograph line. Since November 1977, a total of 1,546 miles of line have been surveyed with a total of 512 sites located, or one site for every 3 miles of line. As a result of 9,100 miles of new line, 3,033 sites could be located in the short-term. In the long-term, 20,300 miles of new line would result in the location of 6,766 sites. In the long-term, all other energy minerals activities could result in the location of 5 sites. The bulk of the existing surveys have been on the mesa west of the Rio Grande Valley to the East Potrillo Mountains. Recent activity has focused more on the "bootheel" and Deming area, with some work in the Jornada area. There has not been enough survey in the area of the predicted well to estimate site density in that township.

There would be no significant impact from the five geothermal shallow temperature gradient holes drilled per year in the long-term. The current policy is to perform a cultural resource survey on the holes that require mud pits or tanks. There are not sufficient data to predict the impact of the greenhouse project. The closer to the Rio Grande it is located, the higher the probability of encountering cultural remains.

Under this alternative, several sites would receive special protection. Fort Cummings and the Massacre Peak petroglyphs would not be open to leasing, therefore no impacts would occur. There would be a protective stipulation on the nationally significant site of Oldtown; again no impact from oil and gas or geothermal activities would occur. In addition, a number of protective stipulations would be placed on 671,491 acres for protection of other values. This would protect an anticipated 20,984 sites from potential surface disturbance. A few of these would be near potential oil and gas and geothermal exploration areas. Their significance and extent can not be predicted at this time.

Since it is very unlikely that a seismograph line would be run over the broken terrain of the Aden Lava Flow, there would be no impacts to the Research Natural Area (RNA).

No Action (NA) Alternative

Impacts to cultural resources would be the same as the existing situation.

Maximization (MAX) of Energy Minerals Leasing Alternative

Under this alternative, all land would be open to leasing and occupancy. The nationally significant Fort Cummings could be impacted by seismic operations near the fragile walls that are still standing. The vibration could cause them to fall if the activity is within several hundred feet, causing a highly significant change in the nature of the Fort. If a drilling rig is located near the Fort, the vibration of the rig could cause the walls to crumble, the well and drill pad would be a serious visual intrusion, and the access road would allow considerably better access to the area than is presently available, increasing the possibility of vandalism. The intensity would decrease the further away the rig is from the Fort. Also, access roads in the vicinity of Oldtown would increase the opportunity to further vandalize the site.

Construction of an access road to a well pad near the state significant Massacre Peak Petroglyph Site would improve access to the area, thereby potentially increasing vandalism to the petroglyphs and having an increasing impact over time on the nature of the site. Seismic activities, well pad construction, and access roads could severely change the nature of segments of the nationally significant Butterfield Trail; however, cultural surveys are performed prior to surface disturbing activities. Through these surveys, 3,033 sites could be located in the short-term and 6,766 sites could be located in the long-term. Archaeological resources are subject to partial or total destruction by any surface or subsurface disturbance if they have not been identified and excluded in the plan of operation. If salvage of these sites is done hastily preceding oil and gas exploration or development, there would be a chance that the maximum values of more deliberate work would not be attained.

It is very unlikely that a seismograph line would be run over the broken terrain of the Aden Lava Flow. Drilling for oil and gas would not be expected in areas with extensive volcanism because of the low success ratios of drilling in lava in other areas. Most of the geothermal wells and test holes that have been drilled in the past few years have received archaeological surveys. A check of the Las Cruces District Office files reveals that 35 shallow wells have been drilled around the lava flow, but only two of them are on the boundary of the RNA. Further extensive exploration would be unlikely.

Enhancement of Other Resource Values (EORV) Alternative

Under this alternative, a number of specific areas containing cultural resources would be given special protection. The nationally significant Butterfield Trail would have a protective stipulation that would limit surface disturbance near well-preserved portions of the trail where modern roads do not exist and historic ruts can be seen. The Butterfield Trail bisects the Resource Area from roughly east to west. No oil or gas or geothermal development would be expected to occur near the Butterfield Trail. An area of 5,999 acres surrounding Fort Cummings, a nationally significant military post, would not be open to leasing although exploration would continue in the area. The state significant Massacre Peak petroglyphs would not be open to leasing, therefore no impacts would occur. Oldtown, a nationally significant Mimbres site of 20 acres, would have a no surface occupancy stipulation. No energy minerals development would be expected near it. There are a number of other areas that could contain cultural resources which have either a not open to leasing or no surface occupancy stipulation. They contain a total of 683,635 acres with a potential site population of 21,364. Some of these sites are probably close to energy minerals development areas; however, their significance and extent cannot be predicted at this time. If cultural surveys are performed prior to surface disturbing activities, 3,033 sites would be located in the short-term and 6,766 sites would be located in the long-term.

Rangeland Management

Proposed Action (PA)

It is impossible to predict impacts on an allotment-by-allotment basis because of the lack of an adequate inventory. Based on the existing survey data, there is an average of one site per 32 acres. Based on the number of acres heavily trampled around livestock waters and the number of acres disturbed by a construction project, Table 3-11 gives a prediction of cultural sites disturbed under the PA (using the above acres per recorded site). A total of 120 sites could be in the area of proposed developments. Before construction starts, a Class III survey would be performed on the areas of primary and secondary impact to determine if a site is present. If a site is located during a preconstruction survey, every effort would be made to relocate the rangeland development away from the site. If it cannot be relocated, then Section 106 compliance procedures would be initiated to start the formal mitigation process.

The Class III inventories for rangeland projects would add data on 3,780 acres during construction of rangeland developments, assuming a Class III survey of all surface disturbing projects. The rangeland developments would have various impacts on cultural resources, as shown in Table 3-11. The chemical vegetation treatment impacts were arrived at by contacting various radiocarbon laboratories for their opinions. Most laboratories thought that they could remove the inert carbon if they knew the sample was contaminated; the removal of any modern carbon would be more difficult. This would mainly affect shallow hearths and soil samples. The fencing of riparian areas along Blue Creek, Ash Creek, and the Gila River would slightly decrease trampling damage on those areas. The presence of water strongly increases the probability of sites in these areas.

Reductions in livestock numbers would slightly decrease the churning of sites and breakage of artifacts caused by cattle trampling. In areas away from heavy cattle use, this would be an insignificant impact throughout the entire 3-County Area. Over a long period of time, it could affect sites that are not deeply buried and make their interpretation more difficult.

No Action (NA) Alternative

Under the No Action Alternative, trampling damage would be maintained at its present rate. The construction of rangeland developments would continue at the present rate, therefore impacts would be the same as the existing situation.

Maximization (MAX) of Livestock Forage Production Alternative

Based on the number of acres heavily trampled around livestock waters and the number of acres disturbed by a construction project, Table 3-11 gives a prediction of cultural sites disturbed under the MAX Alternative. A total of 496 sites would be in the area of proposed rangeland developments and mechanical vegetation treatments. Before

TABLE 3-11

PREDICTED CULTURAL SITES IMPACTED BY THE PROPOSED ACTION AND MAX ALTERNATIVE[a]

Rangeland Developments	Units	Acres Surveyed Per Unit[b]	Total	Number of Sites Predicted[c]
		Proposed Action[d]		
Dirt Tanks	25	40	1,000	31
Pipelines (miles)	67	6	402	13
Drinking Troughs	47	40	1,880	59
Wells	11	1[e]	11	1
Storage Tanks	17	1[e]	17	1
Erosion Dikes	68	2	136	4
Fences (miles)	55	6	330	10
Umbrella Catchments	4	1	4	1
TOTAL			3,780	120
Maximization of Livestock Forage Production Alternative				
Dirt Tanks	49	40	1,960	61
Pipelines (miles)	224	6	1,464	46
Drinking Troughs	145	40	5,800	181
Wells	46	1	46	1
Storage Tanks	48	1	48	1
Fences (miles)	192	6	1,152	36
Erosion Dikes	94	2	188	6
Umbrella Catchments	4	1	4	1
Mechanical Vegetation Treatment	1	5,230	5,230	163
TOTAL			15,892	496

Source: BLM Las Cruces District Office files, 1982.

Notes: a/This table does not include trampling away from water sources. Such trampling affects sites over long periods of time to an unknown degree.

b/The acres surveyed for dirt tanks and troughs represent areas of predicted intensive trampling as well as actual construction. The acres surveyed for fences and pipelines represent the regular BLM transect width of 50 feet rather than the area of actual disturbance, which would be less than 50 feet.

c/In cases where site prediction is less than one, one site is predicted.

d/Rangeland developments under the EORV Alternative are the same as those under the PA except for 7.75 miles of fence. This would affect one site.

e/Almost all wells and storage tanks would have a watering facility associated with them, in which case 40 acres would be surveyed. In the few cases where there are no watering facilities, only the actual disturbed area would be surveyed.

construction starts, a Class III survey would be performed on the areas of primary and secondary impact to determine if a site is present. If a site is located during a preconstruction survey, every effort would be made to relocate the rangeland development away from the site. If it cannot be relocated, then Section 106 compliance procedures would be initiated to start the formal mitigation process.

The Class III inventories for rangeland projects would add data on 15,892 acres disturbed during construction of rangeland developments, assuming a Class III survey of all surface disturbing projects. The rangeland developments and vegetation treatments would have various impacts on cultural resources, as shown in Table 3-11.

Enhancement of Other Resource Values (EORV) Alternative

The fencing of riparian areas and watersheds in severe or critical erosion classes would eliminate livestock grazing on 12,921 acres. This would protect 404 sites from trampling. The Class III Inventory of the additional 7.75 miles of fence would result in the location of one site.

Elimination of Livestock Grazing (ELG) Alternative

Under this alternative, the churning of sites and breakage of artifacts caused by livestock trampling on public land would be eliminated.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

The Gila Lower Box Riparian ACEC would protect the large Mogollon style petroglyph panels in the area by limiting access to the area by motorized vehicles and by eliminating some livestock grazing. By using signs to interpret the petroglyph panels, the public's awareness of damage that is done by vandalism would be increased and the likelihood of it occurring would be reduced. The signs would be placed at entrances to the ACEC to avoid visual intrusions, to interpret all of the archaeological resources in the ACEC at one location, and to request that no vandalism to cultural resources take place anywhere in the ACEC. Impacts on the petroglyphs are currently minimal; the ACEC designation would help prevent any unnatural change in the character of the site.

Organ Mountains Scenic ACEC

The Organ Mountains Scenic ACEC would protect cultural resources by withdrawing the area from mineral entry.

Visual Resources

Energy Minerals

Proposed Action (PA)

Under the PA, the surface disturbance and facilities associated with energy minerals activities would cause visual contrasts in the landscape of the Resource Area. The impacts to visual resources from oil and gas geophysical exploration would include the disturbance and destruction of vegetation and clearing of soil surfaces on 14,560 acres in the short-term and 32,480 acres in the long-term. The visual impacts of this surface disturbance would extend over a greater area than these acreages depending on the locations and visibility of the disturbance. The degree or intensity of the impact would vary with the geophysical exploration method used. Other factors, such as cross-country travel and topographic or vegetative screening, would also affect the degree of the impact. For example, seismic, explosive, or electrical resistivity survey methods involving cross-country travel could cause the greatest degree of impact. The visibility of the geophysical exploration lines from major travel routes and population centers would affect the significance of the impact. These impacts would be reduced significantly in the long-term as disturbed areas became less noticeable due to reclamation efforts and natural restoration.

The construction of access and preparation of oil and gas or geothermal drill sites would include the disturbance and destruction of vegetation, the clearing of soil surfaces, and surfacing with caliche. These disturbances, along with the erection of structures, would contrast with the basic elements of the natural landscape. Approximately 159 acres in the Resource Area would be directly affected by oil and gas exploration drilling and production activities. Approximately 54 acres in the Resource Area would be directly impacted by geothermal shallow temperature gradient holes, exploration drilling, and production activities. Again, the visual impacts of this surface disturbance would extend over a greater area than these acreages depending on the locations and visibility of the disturbances. The quality of visual resources would be restored in the long-term following reclamation and rehabilitation in the abandonment phase.

The amount of visual impact resulting from oil and gas or geothermal activities would be determined from site-specific environmental assessments (EAs). Over the long-term, visual contrasts would be minimized to a degree that is compatible with the Visual Resource Management (VRM) class of the area in which the contrasts occur.

Rangeland Management

Proposed Action (PA)

Under the PA, the structures and surface disturbance associated with the proposed rangeland developments and chemical vegetation treatments would cause visual contrasts in the landscape of the 3-County Area.

Rangeland developments would result in surface disturbance on 344 acres in the short-term and 71 acres in the long-term. However, minor visual impacts from these rangeland developments would extend over a greater area than these acreages depending on the locations and visibility of the developments.

Chemical vegetation treatments would result in direct impacts to visual resources on 51,888 acres. Dead and dying plants would be evident in both creosote and mesquite treatment areas for several years. These impacts would be significantly reduced in the short-term as grasses and forbs are reestablished in the treatment areas. In successful mesquite treatment areas, the landform would change significantly in the long-term as sand dunes formerly stabilized by mesquite roots are leveled by erosional forces.

The exact amount of visual impact of each rangeland development or vegetation treatment would be determined through a site-specific EA prior to implementation. Visual contrasts are expected to be minimized to a degree that is compatible with the VRM class of the area in which contrasts would occur. Since no changes in VRM classes would be expected, the impacts to visual resources would not be significant.

No Action (NA) Alternative

Since current livestock management practices would continue, the existing visual resources would not be impacted. No changes in VRM classes would occur in the 3-County Area.

Maximization (MAX) of Livestock Forage Production Alternative

Under the MAX Alternative, visual contrasts in the landscape of the 3-County Area would occur from the structures and surface disturbance associated with the proposed rangeland developments and vegetation treatments.

Rangeland developments would result in surface disturbance on 868 acres in the short-term and 172 acres in the long-term. However, minor visual impacts from these rangeland developments would be expected to extend over a greater area than these acreages depending on the locations and visibility of the developments.

Chemical vegetation treatments would result in impacts to visual resources on 875,767 acres. The impacts of the chemical vegetation treatments would be the same types of impacts as those described under the PA. However, due to the greater acreages involved, the impacts would be evident to a greater degree under the MAX Alternative.

Mechanical vegetation treatments (rootplowing) are proposed for 5,230 acres. Rootplowing would be expected to alter the visual character of the landscape in the short-term since the vegetation of treated areas would be eliminated and the soil surface disturbed. These impacts would be reduced significantly in the short-term since reseeding would reestablish cover in these areas within 3 years.

The exact amount of visual impact of each rangeland development or vegetation treatment would be determined from a site-specific EA prior to implementation. Visual contrasts are expected to be minimized to a degree that is compatible with the VRM class of the area in which the contrasts would occur. Since no changes in VRM classes would be expected, the impacts to visual resources would not be significant.

Elimination of Livestock Grazing (ELG) Alternative

The impacts to visual resources in the 3-County Area as a result of the elimination of livestock grazing on public land would not be significant. No new rangeland developments would be constructed and no vegetation treatments would occur. Rangeland developments which would serve no useful purpose would be removed from public land. This would reduce the visual contrast resulting from the rangeland developments and locally impact the visual resource in the long-term. No changes in VRM classes would occur.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

The Gila Lower Box Riparian ACEC (2,470 acres) would be managed as a VRM Class II, which permits minor to moderate changes in the basic elements of the landscape as a result of management activities as long as the changes do not attract attention. The special management requirements of the proposed ACEC would result in better distribution of livestock and improved condition of the riparian vegetation. This would enhance the natural and scenic values of the Gila Lower Box. The NSO stipulation for energy minerals activities would provide protection from the short-term impacts of such activities.

Organ Mountains Scenic ACEC

The proposed Organ Mountains Scenic ACEC (8,947 acres) would be managed as a VRM Class I. Minor modifications in the basic elements of the landscape as a result of natural ecological changes and very limited management activity would be permitted. Any contrast created within the characteristic landscape would not attract attention. The enhancement provisions of the ACEC special management requirements would benefit the special scenic values of the WSA by requiring the removal of the large gravel piles adjacent to the Stevenson-Bennett Mine in the northwest part of the Scenic Area.

Recreation

Energy Minerals

Proposed Action (PA)

Under the PA, the quality of dispersed recreation opportunities in the Resource Area would be impacted by energy minerals activities. The quality of dispersed recreation opportunities in the Resource Area is dependent on natural settings where contact with other people is low. Increased noise levels, disturbance of soils, and destruction of vegetation resulting from geophysical exploration activities would impact natural values and aesthetics in the short-term. These impacts would be significantly reduced as disturbed areas became less noticeable due to reclamation efforts and natural restoration.

Energy minerals exploration drilling, development, and production activities would also impact the quality of dispersed recreation opportunities through increased noise levels and human presence, disturbance and destruction of vegetation, and clearing of soil surfaces. The displacement of recreationists could occur as recreation resources in one area are impacted by energy minerals activities, causing increased use in other areas.

The most significant aspect of energy minerals development and production activities affecting dispersed recreation opportunities would be increased access. Recreation activities that depend on the use of motorized vehicles for access would be enhanced as a result of additional roads constructed in support of energy minerals activities. Energy minerals access could also open previously inaccessible areas to recreationists. In the long-term, the impacts of energy minerals development and production activities and associated access would be significantly reduced as wells and roads are abandoned and reclaimed.

Most recreation use areas in the Resource Area that are prospectively valuable for oil and gas or geothermal resources (see Map 2-2) would be protected from the impacts of energy minerals exploration drilling activities by protective stipulations (PS) for recreation values or No Surface Occupancy (NSO) stipulations. These areas and the stipulations under the PA are listed below.

Recreation Area	Stipulation Under Proposed Action
Kilbourne Hole National Natural Landmark (NNL)	NSO
Franklin Mountains (south)	PS
Gila Lower Box Riparian ACEC (proposed)	NSO
West Potrillos Primitive Area	PS

The Franklin Mountains area, north of State Highway 404, would be open to leasing with no special stipulations. The natural values and aesthetics of this area could be subject to the impacts of exploration drilling activities described earlier in this section since the area is prospectively valuable for both oil and gas and geothermal resources. Depending on the locations and extent of these activities, the natural and aesthetic values that make this area attractive to recreationists could be irreversibly degraded.

No Action (NA) Alternative

Under the NA Alternative, dispersed recreation resources in the Resource Area would be subject to the impacts of geophysical exploration, development, and production activities as described under the PA with the following exceptions.

Three areas within the Resource Area with special recreation resources would be open to leasing with no special stipulations. The natural values and aesthetics of the Kilbourne Hole NNL and the Franklin Mountains (north and south) areas could be subject to the impacts of energy minerals exploration drilling as described under the PA since the Kilbourne Hole NNL is within a Known Geothermal Resource Area (KGRA) and the Franklin Mountains are prospectively valuable for oil and gas and geothermal resources.

Two other areas in the Resource Area of special interest to recreationists that are prospectively valuable for oil and gas or geothermal resources would be protected by protective stipulations for recreation values or would not be open to leasing. These areas are the Gila River Valley (PS) and the West Potrillos Primitive Area (NOL).

Maximization (MAX) of Energy Minerals Leasing Alternative

Under the MAX Alternative, dispersed recreation resources in the Resource Area would be subject to the impacts of geophysical exploration, development, and production activities as described under the PA.

Under the MAX Alternative, all areas in the Resource Area of special interest to recreationists would be open to leasing with no special stipulations. The natural values and aesthetics of the Kilbourne Hole NNL, Franklin Mountains (north and south), Gila Lower Box, and West Potrillos Primitive Area could be subject to the impacts of exploration drilling activities as described under the PA since these areas are prospectively valuable for energy mineral resources (see Map 2-2). Depending on the locations and extent of these activities, the natural and aesthetic values which make these areas attractive to recreationists could be irreversibly degraded.

Potential developed recreation sites like Kilbourne Hole NNL would be subject to additional impacts. This area has been identified in the Southern Rio Grande Management Framework Plan as a future site for camping and picnic facilities. Occupation of the surface by energy minerals related facilities such as drill rigs, fuel and water storage tanks, generators, etc., would make simultaneous use of the surface for recreation facilities impossible. In addition, opportunities for recreational activities associated with a developed recreation site such as hiking, camping, and picnicking could be physically reduced if energy minerals activities were occurring in surrounding areas.

Indirect impacts could result in the Baylor Recreation Area and Organ Mountains Recreation Area under the MAX Alternative. Opening these areas to leasing would require removal of the segregative effects of the Classification and Multiple Use Act. This would open approximately 3,597 additional acres of the Organ Mountains to locatable mineral entry. The Organ Mountains are known to be mineralized. Depending on the locations and extent of locatable mining activities, opening these areas to mineral entry could result in irreversible degradation of recreation resources as a result of mining activities.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative, the impacts of geophysical exploration, development, and production activities to dispersed recreation resources in the Resource Area would be the same as those described under the PA with the following exceptions.

Five areas within the Resource Area that are prospectively valuable for oil and gas or geothermal resources (see Map 2-2) and of special interest to recreationists would be protected from the impacts of energy minerals exploration drilling activities as described under the PA by NSO stipulations or the areas would not be open to leasing. These areas and the stipulations under the EORV Alternative are listed below.

Recreation Area	Stipulation Under EORV Alternative
Kilbourne Hole National Natural Landmark	NSO
Franklin Mountains (south)	NSO
Franklin Mountains (north)	PS
Gila River Lower Box Riparian ACEC (proposed)	NSO
West Potrillos Primitive Area	PS

Rangeland Management

Proposed Action (PA)

Under the PA, the locations of rangeland developments could slightly influence the quality of an individual's recreation experience in both the short- and long-term. These impacts would primarily affect dispersed recreation activities. For example, fences constructed without adequate access would hinder recreation and off-road visitor use on public land. Livestock waters constructed near recreation use areas would concentrate livestock use in these areas and increase the interaction and conflict between recreationists and livestock operators.

The impacts of rangeland developments on the quality of dispersed recreation activities would be negligible due to the large size of the 3-County Area and relatively low numbers of proposed rangeland developments. No impacts would occur on any existing or potential developed recreation sites or to recreation activities occurring within the sites because potential conflicts would be reduced or eliminated through mitigating measures required in site-specific environmental assessments (EAs).

Activity plans on certain Category I allotments would favor development or enhancement of significant values found to be in conflict with grazing management. Two riparian areas important for recreation that would be affected are the Gila Lower Box and the Guadalupe Canyon Outstanding Natural Area (ONA). The impacts to recreation opportunities in the Gila Lower Box are discussed in the Proposed Special Designation Areas section. The livestock waters proposed for the Guadalupe Canyon allotment would enable cattle to utilize forage away from the stream. This would significantly reduce conflicts between recreationists and livestock. The improved condition of the riparian habitat would significantly improve birdwatching opportunities.

Non-hunting associated recreation visitor hours would be expected to increase under all alternatives due to a predicted increase in the human population of the 3-County Area. This increase would occur regardless of BLM management actions.

Game bird populations would increase in the short-term as a result of proposed vegetation treatments and grazing treatments (see Chapter 3, Wildlife). This would slightly improve game bird hunting opportunities in the short-term.

Food plants for javelina would be expected to decrease under the PA (see Chapter 3, Wildlife). This could slightly impact javelina hunting opportunities.

Deer hunting visitor hours would increase under the PA due to projected increases in the deer population of the 3-County Area. For the purpose of this analysis, the changes in deer hunting visitor hours would be a proportional change based on the projected deer population. Appendix J-1 explains the method used to project hunting visitor hours. Deer hunting visitor hours would increase under the PA to approximately 137,565. This is an increase of 58,005 visitor hours from the existing level of use.

No Action (NA) Alternative

Deer hunting visitor hours in the 3-County Area would be expected to remain near the present level of 79,560.

Maximization (MAX) of Livestock Forage Production Alternative

Under the MAX Alternative, the impacts of rangeland developments on the quality of dispersed recreation activities and on existing or potential developed recreation sites would be the same as those described under the PA.

It is expected that ORV use on approximately 516,798 acres or 32 percent of the public land in the 3-County Area in vegetation treatment (chemical and mechanical) areas would be restricted while the new vegetation responds. This would both reduce overall ORV opportunities and concentrate ORV use in the remaining open areas in the short-term. This impact would not be significant for the 3-County Area since the area is sparsely populated and demand for ORV use areas is not great. Approximately 364,199 acres of mesquite in Dona Ana County would be chemically treated. This would result in short-term ORV use restrictions while the vegetation responds on approximately 32 percent of the public land in Dona Ana County. The impacts of these restrictions could be significant since most of these treatment areas involve sandy range sites south of Interstate 10 that are very suitable for ORV use, accessible, and in close proximity to the major population concentrations in and around Las Cruces and El Paso.

Game bird populations could increase in the short-term on vegetation treatment areas (see Chapter 3, Wildlife). This would moderately improve game bird hunting opportunities in the short-term. Food plants for javelina would be expected to decrease under the MAX Alternative. This could slightly impact javelina hunting opportunities.

Deer hunting visitor hours would increase under the MAX Alternative due to projected increases in the deer population of the 3-County Area. (See Appendix J-1, Recreation methodology.) Deer hunting visitor hours would increase under the MAX Alternative to approximately 137,565. This is an increase of 58,005 visitor hours from the existing level of use.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative, the impacts to recreation would be the same as those described under the PA with the following additional impacts.

The fencing of 12,921 acres of riparian habitat and watersheds in critical or severe erosion classes on the Gila River would improve fisheries habitat and water quality. This could slightly improve fishing opportunities and other water based recreation opportunities along the Gila River.

Elimination of Livestock Grazing (ELG) Alternative

Implementation of the ELG Alternative would negligibly impact recreation opportunities, other than hunting, in the 3-County Area.

The removal of livestock and existing rangeland developments that serve no useful purpose would eliminate existing and potential conflicts between recreationists and livestock. Cross-country vehicular access would improve with the removal of fences. However, this improved cross-country access would be offset by the reduced levels of maintenance on existing ranch access roads. This could reduce access for all recreation activities.

Increases in game bird populations (see Chapter 3, Wildlife) would improve hunting opportunities. Deer hunting visitor hours would increase significantly to 153,315. This is an increase of 73,755 visitor hours from the current level of use.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

The combination of riparian vegetation, wildlife, water, scenery, and cultural resources in the proposed Gila Lower Box Riparian ACEC support numerous opportunities for primitive types of recreation activities. The management objectives of the ACEC include preservation of these opportunities. Many of the special management objectives would indirectly enhance recreation opportunities in the area. For example, in the long-term, fencing of the ACEC at the top of the river breaks would result in better distribution of livestock, improved condition of the riparian vegetation, improved watershed conditions, and improved water quality. These long-term changes would enhance the natural and scenic values of the ACEC, improve birdwatching opportunities, and enhance other water based recreation opportunities such as swimming, kayaking, rafting, and canoeing. Improvement in fisheries habitat could slightly improve fishing opportunities. Exclusion of livestock from the river bottom at certain times of the year and careful management of salt and mineral supplements would decrease the interaction and conflict between recreationists and livestock. Signing and interpretation of the area's cultural resources and closure of the ACEC to ORVs would enhance and protect primitive recreation opportunities. The development of primitive recreation sites at either end of the Lower Box Canyon to provide for parking, trailheads, and trash receptacles would also provide protection for the primitive values within the canyon.

Gila Middle Box Wildlife ACEC

Under the special management requirements for the Gila Middle Box Wildlife ACEC, no new rights-of-way would be granted, a no surface occupancy stipulation would be placed on energy minerals leases, and the ACEC would be closed to locatable and saleable mineral entry. These restrictions would substantially restrict surface disturbance in the ACEC. Restricting surface disturbance would help maintain water quality and improve watershed conditions in the long-term. These long-term impacts would indirectly help preserve the quality of water-based recreation opportunities in the Gila Middle Box.

Organ Mountains Scenic ACEC

The quality of the many recreation opportunities available in the Organ Mountains Recreation Lands (OMRLs) is heavily dependent on the natural and scenic values of the Organ Mountains. The Organ Mountains Scenic ACEC would encompass an area of 8,947 acres within the OMRLs (27,193 acres). Under the special management requirements for the Organ Mountains Scenic ACEC, the area would be managed as a VRM Class I, no new rights-of-way would be granted, a no surface occupancy stipulation would be placed on energy minerals leases, and the ACEC would be withdrawn from locatable and saleable mineral entry. These restrictions would substantially restrict surface disturbance in the ACEC and provide protection for natural and scenic values. For example, only natural ecological changes and very limited management activities would be allowed under a VRM Class I. Since the recreation opportunities of the OMRLs are heavily dependent on the natural and scenic values of the Organ Mountains, restricting surface disturbance would indirectly protect the dispersed recreation opportunities within the ACEC. Withdrawing the ACEC from mineral entry would provide significant protection for dispersed recreation opportunities because the west face of the Organ Mountains is known to be mineralized. However, mining activities on the valid existing claims in this part of the ACEC could result in irreversible impacts on the quality of dispersed recreation opportunities.

Existing Area of Critical Environmental Concern (ACEC)

Energy Minerals

Proposed Action (PA)

Under the PA, the Central Peloncillo Research Natural Area (RNA) ACEC would be managed under a No Surface Occupancy (NSO) stipulation. Under an NSO stipulation, no impacts to the natural resources would occur since surface disturbing energy minerals activities would not be allowed on the 2,644 acres within the designated ACEC. Directional drilling from adjacent open land would be allowed, but would not be expected because of the low potential for energy minerals in the area.

No Action (NA) Alternative

Under the NA Alternative, the Central Peloncillo RNA ACEC would be managed under a protective stipulation (PS) which recognizes the special resource values for which the area was designated. The PS would place strict on-site stipulations on any energy minerals operations to be conducted in the area to ensure that impacts remain minimal. No energy mineral development would be expected on the ACEC since little or no energy minerals potential exists in the area.

Maximization (MAX) of Energy Minerals Leasing Alternative

Under the MAX Alternative, all 2,644 acres within the Central Peloncillo RNA ACEC would be open to energy minerals leasing. Long-term impacts resulting from energy minerals development would not be expected since there is little or no potential for energy minerals in the area. Furthermore, all energy minerals operations would conform to site-specific stipulations under standard operating procedures which would mitigate impacts.

Wilderness

Energy Minerals

Proposed Action (PA)

Energy minerals activities in all Wilderness Study Areas (WSAs) and non-WSAs under appeal in the Resource Area would be regulated so as not to impair the suitability of these areas for wilderness designation. These areas would be managed under the Interim Management Policy and Guidelines for Land Under Wilderness Review (IMP) (December 1979) until Congress decides to designate them as wilderness or drop them from further wilderness review. Should all or part of these areas be designated as wilderness, they would be managed under BLM's Wilderness Management Policy (WMP) (September 1981). Since these areas would be covered by the Wilderness Protection Stipulation, there would be no significant impacts to wilderness values.

Rangeland Management

Proposed Action (PA)

All WSAs and non-WSAs under appeal in the 3-County Area would be managed under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (IMP) (December 1979) until Congress decides to designate them as wilderness or drop them from further wilderness review. Should all or part of these WSAs be designated as wilderness, they would be managed under BLM's Wilderness Management Policy (WMP) (September 1981).

The purpose of the IMP and WMP is to ensure that activities within WSAs such as allowed grazing use or management actions to support grazing use would not degrade wilderness values. New rangeland developments would be allowed in WSAs if they are substantially unnoticeable in the area. There would be no significant impacts to wilderness values in the 3-County Area under the PA.

Maximization (MAX) of Livestock Forage Production Alternative

Vegetation treatments (chemical and mechanical) would not be allowed under the IMP in WSAs, in non-WSAs under appeal, or in designated wilderness under the WMP.

Enhancement of Other Resource Values (EORV) Alternative

The elimination of livestock grazing on 12,501 acres of watershed in critical or severe erosion classes in the area around the Gila Lower Box would improve water quality in the Gila River in the long-term. Improved water quality would enhance water-based primitive recreation activities in the Gila Lower Box WSA.

Elimination of Livestock Grazing (ELG) Alternative

Under the ELG Alternative, the vigor of the plant communities within the WSAs in the 3-County Area would improve. This would improve the natural and scenic qualities of the WSAs in the long-term.

Removal of any existing rangeland developments located within the WSAs would reduce the amount of vehicle use on the existing access routes to such developments. Removal of rangeland developments could improve the scenic and natural qualities of the WSAs in the long-term. Reduced use on access routes could enhance opportunities for solitude and primitive recreation as well as improve natural and scenic values in the long-term.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

Approximately 2,469 acres of the Gila Lower Box WSA would be within the administratively designated Gila Lower Box Riparian ACEC. The special management requirements for livestock grazing within the ACEC designed to improve the riparian vegetation would enhance the natural and scenic values in the Lower Box portion of the WSA in the long-term. The management of wildlife under a HMP and the transplanting of desert bighorn sheep into the area would enhance the special wildlife features of the WSA. Designation of the area as limited to existing roads and trails for ORV use, the development of primitive recreation sites at either end of the Gila River Canyon, the installation of signs at major access points describing cultural resources, and the acquisition of state and private lands would generally enhance existing primitive recreation opportunities within the ACEC. The portion of the WSA within the ACEC could be expected to substantially retain its wild character as long as the area is administratively protected.

The development of livestock waters outside of the ACEC could impact the natural values of the southern part of the WSA. The impact could be negligible to moderately significant depending on the number, type, and location of the waters and access requirements.

Organ Mountains Scenic ACEC

Approximately 6,690 acres in the Organ Mountains WSA would be within the 8,947 acres administratively designated as the Organ Mountains Scenic ACEC. The objectives of the ACEC are to protect, to prevent irreparable damage, and to enhance the scenic values of the Organ Mountains. (See Map 2-8 for the general location of the ACEC.)

The special management requirements of the ACEC include retention of the following existing management restrictions: closure of the area to plant collection and sale, closure to ORV use except on existing roads and trails, and segregation of approximately 1,479 acres from all forms of mineral entry (under the Classification and Multiple

Use Act of 1964). Additional special management requirements would include management of the ACEC as a VRM Class I, removal of the exposed gravel piles near the Stevenson-Bennett Mine , and withdrawal of the remainder of the ACEC from locatable mineral entry subject to valid existing rights. A NSO stipulation would apply to any oil and gas or geothermal activities. No new rights-of-way would be approved. Cooperative agreements would be sought with the Regents of NMSU and the State Land Office to ensure that the management of University and state lands in the Organs are managed as a VRM Class I.

Since the special management requirements would strictly limit surface disturbance, designation of the Organ Mountains Scenic Area as an ACEC for visual resources would provide all but 593 acres along the west boundary of the Organ Mountains WSA with administrative protection in the short-term. However, management of the area as an ACEC would be subject to administrative change in the long-term. The enhancement provisions of the ACEC special management requirements would benefit the special scenic values of the WSA by requiring removal of the large gravel piles adjacent to the Stevenson-Bennett Mine.

Other Land Uses

Energy Minerals

Maximization (MAX) of Energy Minerals Leasing Alternative

Under the MAX Alternative, the entire Resource Area would remain open to energy minerals leasing and associated exploration and development with no special restrictions or stipulations required. Energy mineral activities could conflict with many other designated land uses such as: ecological plots, sanitary landfills, cemetaries, religious and school sites, recreational use areas, observatory sites, airports, and other miscellaneous areas. The impacts on these areas from energy minerals activities would be irretrievable losses in association with the ecological plots to major short-term disruption of existing uses in association with recreational areas and airports; and minor short-term disruption in association with public purposes such as sanitary landfills.

Other land uses in the Resource Area hold important values in terms of the local communities. In most cases, however, the magnitude of the impacts would be small because these areas are within low potential areas for energy minerals, in many instances the slope would be prohibitive for development, and the majority of these designated use areas are individually small in terms of size and energy minerals development could take place just outside the special use area. An exception would be the ecological plots, although the areas are small, the resource loss would be very significant.

Social Conditions

Energy Minerals

Proposed Action (PA)

Demography

Under the PA no major changes in the structure, composition, or demographic characteristics of the LCLRA would occur.

In the short-term, 791 new jobs would be created under the PA. Using a worst case analysis and assuming that all the jobs would be filled with migrants to the Resource Area, 2,477 workers including their families would move to the area. This number is 1.72 percent of the 1980 census population count and over the 14 years would be an average annual increase of 177 people. However, given the high unemployment rates of the Resource Area, it would be expected that jobs would be filled by local workers when a skill-match could be made.

In the long-term, 3,391 new jobs would be created under the PA. Using a worst case analysis and assuming that all the jobs would be filled with migrants to the Resource Area, 10,618 workers including their families would move to the Area. This number is 7.36 percent of the 1980 census population count and over the 15 years would be an average annual increase of 708 people.

The average annual population growth for the LCLRA from 1970 to 1980 was 3.32 percent (see Table 2-18) and the population projections by Vest (1982) indicate that the population growth until 2000 would continue at about the same rate (3.2 percent). The maximum number of migrants under the PA using the worst case analysis would contribute less than half of one percent to the average annual growth rate.

In both the short- and long-term, it would be expected that the immigrants would be dispersed through the Resource Area. However, if the incoming people concentrate in some of the small, rural communities which would cause an annual population growth rate of 5 percent or more, major changes not only in demography but infrastructure, social well-being, and community lifestyles and values would occur.

Social Well-Being

The quality of life would remain as it is at the present time. A change in employment, would increase material well-being. Additional impacts in a change of employment would result in having access to goods and services which are needed and additional amenities which are desired.

Community Lifestyles and Values

The lifestyles and values which characterize the area would undergo no major changes; however, the occupational roles and identity associated with oil field activities would be increased.

Public Attitudes, Concerns, Issues

There would be varying attitudes toward oil and gas and geothermal exploration by the residents of the area according to their occupation and interest. The residents of the area appear to be ambivalent about economic development and demographic change in the region. In past surveys, a majority of respondents have consistently chosen no change alternatives in general, but favored specific development options when they are discussed. On the one hand, the long-term residents have been acquainted with depression and decline and want to have expansion and growth in order to be able to hold good jobs and create opportunities for their children. Many residents feel that growth is inevitable. On the other hand, they worry about the implications of growth and are concerned about the increasing size of individual influence locally and the dilution of native values due to the in-migration of outsiders (Harbridge House Inc. 1978).

The inhabitants like their towns and counties the size they are now or traditionally have been. They believe the future would bring more migrants and destruction of the trusting, friendly, easy-going atmosphere (Harbridge House Inc. 1978).

The mining interests are also intensely concerned about planning decisions affecting the use of the land. Mining companies, individual prospectors, and engineers seek keeping public land accessible. The mining interests place value on the development of resources, and they oppose any action which might obstruct resource development. Energy minerals production, from their perspective, is associated with economic progress and improvement in living standards, quality of life, and human technology. Mineral production represents a good and its obstruction an evil (Harbridge House Inc. 1978).

The most intense expressions of feelings from the residents are often aroused over specific areas, objects, or resources. Certain places or things are valued by almost all inhabitants of southwestern New Mexico, such as desert and mountain areas. Residents of Las Cruces share the attitude that the nearby Organ Mountains should be preserved and protected. This area serves as a center of recreational activity by local citizens and is the source of much civic pride (Harbridge House Inc. 1978). Under this alternative, the special stipulations for the Organ Mountains would ensure that these feelings would be preserved.

Recreational users place great value on the ability to pursue leisure time activities, especially those in which individual users are most interested. Hunters believe that public land management should incorporate their priorities. Hunters believe in wildlife conservation on public land and improved access to game areas (Harbridge House Inc. 1978). For many people, hunting represents a necessary recreational release from workday pressures. The opportunities for recreation and viewing wildlife would be enhanced. Opportunities for "just knowing" that wildlife are there also would be enhanced.

Summary

Under the PA, no major changes in the structure, composition, or demographic characteristics of the LCLRA would occur. The quality of life would remain as it is at the present time except for those who have a change in employment, resulting in an increase in material well-being and more access to goods, services, and amenities. The lifestyles and values which characterize the area would undergo no major changes; however, the occupational roles and identity associated with oil field activities would be increased.

No Action (NA) Alternative

Demography

Under the NA Alternative, no major changes in the structure, composition, or demographic characteristics of the population in the LCLRA would occur.

Social Well-Being

There would be no major changes in the infrastructure. However, the residents' perception of their social well-being could be lowered as increasing demands for services are made but no improvements and additions have been made because no new monies have been generated.

The network of social relationships would continue with only natural change. The values of living in the area, the ranching/rural lifestyle, the climate, the small size/neighborliness of the community, friendly people, the beauty of the area, and recreational opportunities would not be affected under this alternative. Residential stability would be maintained. Economic insecurity would continue to be a problem. Family stability would remain as it is.

Community Lifestyles and Values

Energy minerals leasing and exploration activities would continue as it has historically. The lifestyles and values of the residents would be the same as the existing situation.

The lifestyles of those in the mining occupation would not be altered under this alternative. However, there would be major changes until depressed prices revive.

Attitudes, Concerns, Issues

There would be some segments of the community who would view the NA Alternative as too closely associated with ranching interests. The energy minerals industry would feel that the BLM has been too restrictive in the public land it opens for leasing and exploration, and would therefore oppose this alternative.

Maximization (MAX) of Energy Minerals Leasing Alternative

Under the MAX Alternative, there could be a greater chance for opposition by the public to the lifting of the special stipulations on ecological plots, special designation areas, recreation or public purposes areas, and other areas as shown on Table 1-2.

The most intense expressions of feelings from the residents are often aroused over specific areas, objects, or resources. Certain places or things are valued by almost all inhabitants of southwestern New Mexico, such as desert and mountain areas. Residents of Las Cruces share the attitudes that the nearby Organ Mountains should be preserved and protected. This area serves as a center of recreational activity by local citizens and is the source of much civic pride (Harbridge House Inc. 1978). Since the Organ Mountains do not have a special stipulation under this alternative, opposition could result.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative, a large segment of the public would favor special stipulations to protect environmental values (see Table 1-2). Concurrently, most people in the energy minerals industry would oppose closing these areas as the minerals activities would be curtailed.

Rangeland Management

Proposed Action (PA)

Demography

Under the PA, no major changes in the structure, composition, or demographic characteristics of the LCLRA would occur. In the short-term, the decreases in AUMs would not cause any ranchers or ranch hands to move from the area. However, a fewer number of ranch hands would be employed. In the long-term, fewer ranch hands would be employed, due to the increases in AUMs but not enough to significantly change the demographic characteristics of the area or of the livestock operating population.

Social Well-Being

Using statistical measures for the objective conditions of social well-being (see Chapter 2, Social Well-Being), major changes in the social well-being of the inhabitants of the Resource Area would not be expected in the short-term. Within the ranching community, some individual and family personal income would not increase at as fast a rate as for the total population of the area. In the long-term, a slight increase in the personal income for the ranching population would occur. Increases in material well-being would result in enhanced social well-being by having access to goods and services which are needed and additional amenities which are desired.

It is not known how many members of the ranching population have supplemental income from other jobs or supplement their other job or business with ranching income; however, for the Southern Rio Grande Planning Area it was stated that "for a majority of the cattlegrowers in the area, their ranches are not their only source of income" and that the patterns of family commitment to, and involvement in, ranching operations illustrate the fact that profit maximization is usually not the primary incentive for operators to stay in the livestock industry (Harbridge House Inc. 1981). This statement is also supported by research which indicates that quality of life may rank higher than income among goals for the agricultural operations (includes ranching operations) in New Mexico (Clyde Eastman et al. 1980).

The infrastructure would remain as it is at present with decreasing social and economic services in the rural communities and somewhat increasing pressure for service in the Las Cruces area as rural to urban migration occurs.

Community Lifestyles and Values

The network of social relations would continue with no major changes. The values of living in the area, the ranching/rural lifestyles, the climate, the small size/neighborliness of the communities, and friendly people (Harbridge House Inc. 1978) would not be affected. Ranching as an occupational way of life would undergo no major changes, and the roles and identity as "rancher" would continue. Under the PA, the patterns of residental stability or the stability of the family would not change. The opportunities for recreation, especially hunting for big game, would be enhanced, thus providing relief from daily stress, opportunities for increasing family solidarity, and physical and mental fitness by being outdoors. For others, the aesthetic opportunities for viewing wildlife would be increased.

Under the PA, the kind of future environment which most of the residents prefer, one that is similar to the present which is characterized by clean air, open space, and the primarily agricultural setting would not change (Harbridge House Inc. 1978). Also, the area's shared western way of life would not change to a significant degree.

Under the PA, the social and political divisions which were perceived by respondents in the Harbridge House study (1978) would neither increase nor decrease to a significant degree. These divisions would continue.

Public Attitudes, Concerns, Issues

Under the PA, individual attitudes toward land use and public land in relation to the magnitude that their attitudes have been formed by occupation and interest would be affected. There is not only increasing pressures produced by a large and growing urban presence, but there is also a shift in emphasis toward BLM's concept of multiple use. As a result, some formal conflicts over land use and friction between rural and urban residents would be expected to increase (Harbridge House

Inc. 1981). This recent emphasis has angered many permittees (Harbridge House Inc. 1978).

Public sentiment throughout the country regarding chemical spraying has run high in the last few years, primarily because of the publicity concerning the effects, either real or perceived, of Agent Orange and other chemicals. Harbridge House reported that respondents to a survey indicated that one preference for the future of the area was an environment characterized by clean air (Harbridge House Inc. 1978). Some residents fear that chemical spraying would change this characteristic.

Recreational users place great value on the ability to pursue leisure time activities, especially those in which individual users are most interested. Hunters believe that public land management should incorporate their priorities. Hunters believe in wildlife conservation on public land and improved access to game areas (Harbridge House Inc. 1978). For many people, hunting represents a necessary recreational release from workday pressures. The opportunities for recreation and viewing wildlife would be enhanced. Opportunities for "just knowing" that wildlife are there also would be enhanced.

Summary

Under the PA, no major changes in the structure, composition, or demographic characteristics of the population nor of the livestock operating population in the LCLRA would occur.

Under the PA, no major changes in the social well-being of the inhabitants of the area would occur. In the long-term, the social well-being would be marginally enhanced as a result of the slight increase in income. The infrastructure would remain as it is at the present time with decreasing social and economic services in the rural communities and increasing pressure in the Las Cruces area as rural to urban migration occurs.

The values of living in the area and the lifestyles would not be changed. The opportunities for recreation and viewing wildlife would be enhanced, as would the opportunities for "just knowing" that wildlife exist.

No Action (NA) Alternative

Demography

Under the NA Alternative, no major changes in the structure, composition, or demographic characteristics of the population nor of the livestock operation population would occur.

Social Well-Being

There would be no major changes in the infrastructure. However, the residents' perception of their social well-being could be lowered as increasing demands for services are made but no improvements and additions have been made because no new monies have been generated by those in the ranching occupations.

The network of social relationships would continue with only natural change. The values of living in the area, the ranching/rural lifestyle, the climate, the small size/neighborliness of the community, friendly people, the beauty of the area, and recreational opportunities would not be affected under this alternative. Residential stability would be maintained. Economic insecurity would continue to be a problem. Family stability would remain as it is.

Community Lifestyles and Values

The lifestyles which characterize the LCLRA, and in particular ranching as an occupational way of life, would not undergo any major changes and the patterns of living and the roles and identity as "rancher" would continue. However, with continuing economic problems, the ranching population would continue to decline as they seek employment in the urban areas, thus diluting the roles and identity as "rancher."

Attitudes, Concerns, Issues

There would be some segments of the community who would see the NA Alternative as too closely associated with ranching interests. The commonly-held value of the ranchers that agriculture and ranching represent the basis of the human economy leads to the feeling that farming and ranching are fundamentally good and should be encouraged. This leads to the attitude that ranching should have priority in making use of public land and that government policy should seek to reduce ranch costs, including grazing fees (Harbridge House Inc. 1978). This attitude would continue with no change as a result of the NA Alternative.

Maximization (MAX) of Livestock Forage Production Alternative

Demography

In the short-term, the effects of implementing this alternative are the same as those discussed under the PA for grazing management. In the long-term, the increases in AUMs and rangeland developments would create 188 jobs. However, no major changes in the size, structure, or composition of the population would be created.

Social Well-Being

Under this alternative, no major changes in the social well-being of the inhabitants of the Resource Area would occur. In the short-term, the psychological well-being of those livestock operators whose actual number of AUMs used is reduced, would be affected. In the long-term, after vegetation treatments, monitoring studies, and increases in AUMs, the psychological and social well-being would be improved. The increase in income would enhance social well-being by ensuring more opportunity for goods, services, and amenities.

The infrastructure would not be affected in any major way and it would remain as it is at the present in the short-term. In the long-term, the monies generated by the increase in AUMs could bring slight improvements.

Community Lifestyles and Values

Under the MAX Alternative, the continuation of the community lifestyles, particularly the lifestyles of ranching would be ensured. The aspects of the area which the residents especially like, the rural lifestyles, the climate, the small size/neighborliness of the community, friendly people, and recreational opportunities would not change. The prestige of the ranchers would be enhanced as the rangeland becomes more productive.

Attitudes, Concerns, Issues

The commonly-held value of the ranchers that agriculture and ranching represent the basis of the human economy leads to the feeling that farming and ranching are fundamentally good and should be encouraged. This leads to the attitude that ranching should have priority in making use of public land and that government policy should seek to reduce ranch costs, including grazing fees (Harbridge House Inc. 1978). Because the priority in this alternative is placed on maximizing livestock forage production, the attitudes mentioned above could be enhanced.

Enhancement of Other Resource Values (EORV) Alternative

Demography

In the short-term, there would be a reduction of 89 jobs and in the long-term, four jobs. This would not significantly change the size, structure, or composition of the population.

Social Well-Being

In the short-term, there would be minor deteriorating changes in the infrastructure as less monies would be generated by those in the ranching occupations. The ranching population's perceptions of their social well-being would be lowered as their opportunities for goods, services, and amenities and their status is diminished. In the long-term, the infrastructure would remain as it is now as new monies which would be generated would show no real gain because it would take additional monies to make up for those lost in the short-term. The network of social relations would be disrupted to a minor extent if some of the ranching population should relocate. The values of living in the area, the ranching/rural lifestyle, the climate, the small size/neighborliness of the community, friendly people, and recreational opportunities would not change. The valued beauty of the area would be disrupted by the vegetation treatments in the short-term, depending on the type of vegetation treated and the size of the treatment area. However, in the long-term, the beauty would be restored or enhanced through improved rangeland condition.

In the long-term, the social status of the ranchers would be enhanced with the increase in economic benefits, giving them more opportunities for goods, services, and amenities.

Community Lifestyles and Values

No major changes in the lifestyles and values of the people in the 3-County Area at large would occur, however, economic hardships would be created for three ranch operations which could change the lifestyles of the ranch operators.

Attitudes, Concerns, Issues

Under this alternative, the concept of multiple use would receive more emphasis which conflicts with the values of the ranchers that agriculture and ranching are fundamentally good and should be encouraged. This feeling is often translated into the attitudes that ranching should have priority in making use of public land and that government policy should seek to reduce ranch costs, including grazing fees (Harbridge House Inc. 1978).

Under this alternative, the attitude of individuals who have encouraged government action in order to preserve wilderness and wildlife would be enhanced. However, most residents do not share this interventionist attitude, and many associate it with unidentified wealthy outsiders from El Paso and Washington (Harbridge House Inc. 1978).

Elimination of Livestock Grazing (ELG) Alternative

Demography

The elimination of livestock grazing on public land would create some major changes in the size and distribution of the ranching population but not in the population of the LCLRA. Using a worst case analysis and estimating that the 334 people in the livestock operating and related businesses were displaced, a total of 1,046 people would be affected. This movement would be dispersed throughout the 3-County Area with a large proportion moving from the rural to urban areas in search of jobs. Some would be expected to go outside the 3-County Area to Las Cruces and few would be expected to move out of the state.

Social Well-Being

The major decrease in rancher income would lower the social well-being of all livestock operators in the respect that their accessibility to goods and services would be decreased. Their income would be further reduced by the added expense of ensuring no trespass on state and private lands either by fencing or close herding. The operators who do not live on and operate their ranch would be less affected under this alternative, as the decrease would be in supplemental rather than in subsistence income. Decreases in access to goods and services would affect the business operations of the small towns and villages as the ranchers would have less money for purchases. The infrastructure would be weakened by increasing demands made for income assistance, counseling and medical care, and other services as a result of unemployment.

Community Lifestyles and Values

Using a worst case analysis and assuming that the operator who are more than 50 percent dependent on public land would be displaced, it is estimated that the lifestyles of ranching would be threatened for 68 livestock operators. The results of unemployment would diminish the psychological well-being by creating feelings of depression, loss of self-esteem, anger, frustration, feelings of helplessness and futility. The emotional feelings which rancher attach to land would be seriously disturbed and many would perceive their family history which is associated with ranching as being destroyed. Many residents of the area would perceive that a "pioneer ethic" as a sociological phenomena was disappearing from the ways of life in the area.

Family stability would be disrupted, and the network of social relationships would be seriously impaired.

The values held by the environmentalist would be enhanced by the elimination of livestock grazing. There would be an increase in wildlife which increases opportunities for aesthetic viewing and existence values. Hunting opportunities also would be enhanced as more wildlife would be available.

Attitudes, Concerns, Issues

Under this alternative, the ranching lifestyle which is characteristic of the area would be threatened. The residents would be affected and the material and social well-being of many. Ranchers and members of the livestock growing industry would be opposed to implementation of this alternative and the attitudes toward BLM would be unfavorable. A few people would approve this alternative, believing that the land would truly be "public land" for multiple use, and that the land would now return to its natural state.

The values of the ranchers are that agriculture and ranching are fundamentally good and should be encouraged. This feeling is often translated into the attitude that ranching should have priority in making use of public land and that government policy should seek to reduce ranch costs, including grazing fees (Harbridge House Inc. 1978). Under this alternative, significant negative impacts would occur on individuals who have these feelings. For many, a part of their heritage would be lost.

Summary

Under this alternative, some changes in the size and distribution of the ranching population would occur but not in the population of the LCLRA.

The social well-being of all livestock operators would be lowered and some would lose their role and identity as "rancher." Family stability would be disrupted, psychological well-being would be lowered, and the infrastructure would have increasing demands. The network of social relationships would be seriously disrupted.

Ranching as a lifestyle would be seriously threatened for many ranchers and ranch hands. The psychological well-being would be diminished. For many, a part of their heritage would be lost.

Economic Conditions

Energy Minerals

Proposed Action (PA)

Under this alternative, energy minerals leasing and associated exploration, development, production, and abandonment operations within the LCLRA, subject to special stipulations, would be allowed on approximately 675,894 acres. Those operations with special stipulations may experience additional operating costs due to the special stipulations in the leases. The remainder of the Federal mineral estate in the Resource Area, approximately 3,132,031 acres, is open to leasing with no special stipulations other than those under the standard operating procedures.

Under the PA, 9,836 acres would not be open to leasing. If these leases would have been leased noncompetitively at an annual rental fee of $1.00 per acre, $9,836 (which the State of New Mexico receives 50 percent) would be lost. In addition, if the area contained appropriate reserves for production, the economic benefit forgone would be loss of royalties from production as well as a loss of expenditures and jobs the energy minerals industry would provide to the Resource Area economy.

In the short-term, total geophysical exploration for oil and gas would be conducted on approximately 9,100 miles. Using an average cost per mile of $2,000 for geophysical exploration (Jennings 1982), approximately $18.2 million would be expended in the Resource Area economy from oil and gas exploration over a period of 14 years (1980-1994). This would increase employment opportunities by 779 jobs (2.5 percent of total employment). The crude-petroleum industry is the primary industry that would benefit by providing 452 of these additional jobs (1.4 percent of total employment) in the short-term. Direct income in the Resource Area economy would increase by $9.2 million (3.3 percent of total direct income), with the crude-petroleum industry contributing $6.1 million of the increase (2.2 percent of total direct income). (BLM Las Cruces/Lordsburg Input-Output Model 1982.) In the long-term over a period of 15 years (1995-2010), total geophysical exploration of oil and gas would be conducted on approximately 20,300 miles. Using an average cost per mile of $2,000 for exploration, approximately $40.6 million would be expended in the Resource Area economy. This would increase employment and direct income in the Resource Area economy by 1,738 jobs (5.4 percent of total employment) and $20.6 million (7 percent of total direct income), respectively. The crude-petroleum industry would be the primary industry affected by this action. The crude-petroleum industry would gain employment opportunities by 1,009 jobs (3.1 percent of total employment) and increase direct income by approximately $13.7 million (4.6 percent of total direct income).

Exploration costs for shallow temperature geothermal exploration are approximately $9.50 per foot (Lahse 1982). If the average shallow well is 500 feet deep, approximately $4,750 would be expended in the Resource Area economy for exploration of each shallow well. Exploration costs for deep well geothermal resources would be approximately $85 per foot (DOI, USFWS 1976). If the average deep well is 15,000 feet deep, approximately $1.2 million per well would be expended in the Resource Area economy.

In the short-term, over a period of 14 years (1980-1994), shallow well geothermal exploration would expend approximately $332,500 into the Resource Area economy. Employment opportunities would increase by approximately 11 jobs and direct income would increase by approximately $172,000 in the Resource Area economy. This would be less than 1 percent of direct income and employment of the Resource Area economy. From this increase in employment opportunities, the geothermal industry would gain approximately 7 jobs and direct income would increase by approximately $125,000.

In the long-term, over a period of 15 years (1995-2010), shallow well geothermal exploration would expend approximately $356,250 and deep well exploration would expend approximately $3.8 million into the Resource Area economy. Employment opportunities would increase by approximately 153 jobs and direct income would increase by approximately $2 million in the Resource Area economy. This would be less than 1 percent of total direct income and employment in the Resource Area economy. From this increase in employment opportunities, the geothermal industry would gain approximately 92 jobs and direct income would increase by approximately $1.6 million. Shallow well geothermal exploration and deep well geothermal exploration (which would occur only once in the long-term) would not change the economic structure of the Resource Area economy. After deep well geothermal exploration occurs, only shallow well geothermal exploration would continue.

Greenhouses that utilize geothermal energy have a variety of uses. In 1979, the New Mexico Energy Research and Development Program estimated the net profit after taxes for an average year of operation for potted chrysanthemum production was $99,411 and for greenhouse tomato production, minus $85,350. Additionally, the net profit estimated for the first year of operation for a beef slaughter and precooking plant was $2,476,631. The type of use for the greenhouse depends on the preferences of the developer and whether or not there is a market for the particular type of product. Therefore, an economic analysis on the profitability of the greenhouse as well as any economic benefits the Resource Area economy would experience cannot be determined.

In the short-term (over a period of 14 years from 1980-1994), the cumulative economic effects in the Resource Area economy for oil and gas and geothermal exploration as analyzed using 1980 dollar figures would not change the structure of the Resource Area economy. Over this period of time, $18.2 million would be expended for oil and gas exploration and $332,500 for shallow well geothermal exploration. Approximately 791 jobs would be generated in the Resource Area economy (2.5 percent of total employment) and direct income would increase by approximately $9.4 million (3 percent of total direct income).

In the long-term, there would be one producing oil well 20,000 feet deep with production at approximately 250 barrels of crude oil per day located in Hidalgo county. In 1980, the average price of crude oil in New Mexico was $25.58 per barrel (New Mexico Bureau of Mines and Mineral Resources 1982). If the oil well is operating 365 days a year, the total revenue produced from this oil well in the long-term would be approximately $3.5 million. The Resource Area economy would experience an increase in employment of approximately 1,500 jobs (4.7 percent of total employment), as well as an increase in direct income of approximately $17 million (6.1 percent of total direct income). Since the oil well would be in Hidalgo County, it is highly probable that the economic benefits of the oil well would be absorbed within that county. The crude-petroleum industry would be the primary industry affected by the producing oil well. There would be an increase of approximately 87 jobs (less than 1 percent of total employment) and an increase in direct income of approximately $12 million (4 percent of total direct income) to this industry, which would be absorbed within Hidalgo County. The producing oil well would not affect the Resource Area economy; however, Hidalgo county would benefit economically since the oil well would be located there. Taxes collected for energy resources provide a substantial portion of state revenue. Using a 1980 tax rate per barrel of $1.833 (New Mexico Bureau of Mines and Mineral Resources 1982), tax revenues to the State of New Mexico in the long-term would be approximately $2.5 million from this producing well.

In the long-term (over a period of 15 years from 1995-2010), the cumulative economic effects in the Resource Area economy for oil and gas and geothermal exploration, and revenues derived from one producing oil well total $79.8 million. This would increase employment opportunities by approximately 3,391 (10 percent of total employment) and would increase direct income by approximately $41 million (13 percent of total direct income).

Summary

In the short-term, total direct income for the Resource Area economy as a result of geophysical and geothermal exploration would increase by approximately $9.4 million. Total employment would increase by approximately 790 jobs.

In the long-term, total direct income for the Resource Area economy as a result of geophysical and geothermal exploration, and one producing oil and gas well would increase by approximately $41 million. Total employment would increase by approximately 3,390 jobs.

No Action (NA) Alternative

Under this alternative, the LCLRA currently has 10 areas that are designated not open to leasing (approximately 108,460 acres). Assuming that these leases would have been leased noncompetitively at an annual rental fee of $1.00 per acre, $108,460 (which the State of New Mexico receives 50 percent) would be lost. In addition, if the areas contained reserves for production, the economic benefit forgone would be loss of royalties from production, expenditures, and jobs in the Resource Area economy. Approximately 564,677 acres are open to leasing with special stipulations. This could increase the plan of operations costs for various oil companies in order to ensure compliance with the special stipulations in the leases. Total direct income for the Resource Area economy would remain at approximately $274 million. Total employment would remain at 30,567 jobs.

Maximization (MAX) of Energy Minerals Leasing Alternative

Under this alternative, opportunities for energy minerals leasing and associated exploration, development, production and abandonment operations would be maximized on 3,817,761 acres of Federal mineral estate. If the total acreage were leased noncompetitively at an annual rental fee of $1.00 per acre (which the State of New Mexico receives 50 percent), $3,817,761 would be generated annually.

In the short-term, total direct income would change to approximately $283 million, an increase of approximately $9.4 million from the existing $274 million. Total employment would change to 31,358, an increase of 791 jobs from the existing 30,567 jobs.

In the long-term, total direct income would change to approximately $315 million, an increase of approximately $41 million from the existing $274 million. Total employment would change to 33,958, an increase of 3,391 jobs from the existing 30,567 jobs.

Enhancement of Other Resource Values (EORV) Alternative

Under this alternative, 7 areas are described as not open to leasing, (approximately 16,960 acres). If these leases were leased noncompetitively at an annual rental fee of $1.00 per acre, $16,960 (which the State of New Mexico receives 50 percent) would be lost. In addition, if the area contained reserves for production, the economic benefit forgone would be the loss of royalties from production, as well as expenditures and employment opportunities in the Resource Area economy.

In the short-term, total direct income for the Resource Area economy would be the same as those discussed under the PA. In the short-term, total direct income would change to approximately $283 million, an increase of approximately $9.4 million from the existing $274 million. Total employment would change to 31,358, an increase of 791 jobs from the existing 30,567 jobs.

In the long-term, total direct income would change to approximately $315 million, an increase of approximately $41 million from the existing $274 million. Total employment would change to 33,958, an increase of 3,391 jobs from the existing 30,567 jobs.

Rangeland Management

This analysis considers direct and indirect impacts of the PA (both short- and long-term) using the 5-year average licensed use since the 5-year average approximates actual use of BLM forage. A linear program model currently on file in the BLM computer system was used to calculate the impacts the various ranch sizes would experience in the short- and long-term due to the change in AUMs under each alternative (see Appendix K-5 for methodology and Technical Report X for more detailed information).

Proposed Action (PA)

Using a worst case analysis, no measurable shifts in employment patterns or unemployment rates would occur in the short-term under the PA. If during the consultation process it is demonstrated that the adjustments would be needed to improve rangeland conditions, primary and secondary effects would result both in the short- and long-term. There would be a decrease of approximately 9 percent in AUMs from the 5-year average for the 167 allotments used by 95 operators. This adjustment would reduce total receipts from ranching by approximately $410,000. Total receipts for the subsistence size operations would be reduced by $655, for the small operations by $592, and $2,903 and $18,740 for the medium and large operations, respectively (BLM Las Cruces District Linear Program Files 1982). (See Table 3-12 for cumulative costs and returns for all ranch operations.) See Appendix K-3 for individual estimated costs and returns for representative ranch operations and Appendix K-4 for impacts on each ranch category.

Ranch operations are valued by financial institutions on the number of AUMs they possess or control. As discussed in Chapter 2, the value of the BLM grazing permits in the 3-County Area is over $25 million. In the short-term, readjustments of grazing privileges from preference to the worst case situation would reduce the valuation of BLM grazing permits for borrowing purposes by 22 percent. This reduction would mean a loss of approximately $5 million in BLM grazing permits and a corresponding decrease in the financial flexibility of ranch operations.

TABLE 3-12

ESTIMATED ANNUAL COSTS AND RETURNS FOR ALL RANCH OPERATIONS BY ALTERNATIVE FOR THE 3-COUNTY AREA

		Proposed Action		Maximization of Livestock Forage Production		Enhancement of Other Resource Values		Elimination of Livestock Grazing
Budget Items	Existing[a/]	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	
Total Receipts	$7,813,071.59	$7,402,370.68	$8,318,530.50	$7,402,370.68	$9,320,464.35	$6,264,020.46	$7,775,458.28	$3,454,054.99
Variable Costs	2,484,226.88	2,355,051.51	2,649,300.46	2,355,051.51	2,968,723.30	1,967,525.55	2,471,514.61	1,075,757.85
AUM Costs	681,524.11	646,585.92	727,982.66	646,585.92	814,955.16	542,251.84	678,806.76	297,437.88
Returns Above Variable Costs	4,647,320.60	4,400,733.25	4,941,247.38	4,400,733.25	5,536,785.89	3,754,243.07	4,625,136.91	2,080,859.26
Fixed Costs[b/]	417,918.04	417,918.04	417,918.04	417,918.04	417,918.04	417,918.04	417,918.04	417,918.04
Depreciation[b/]	1,270,588.32	1.270,588.32	1,270,588.32	1,270,588.32	1,270,588.32	1,270,588.32	1,270,588.32	1,270,588.32
Returns to Operator, Labor, Management, Capital	2,958,814.24	2,712,226.89	3,252,741.02	2,712,226.89	3,848,279.53	2,065,736.71	2,936,630.55	392,352.90

Source: BLM Las Cruces District Office Files, 1982.

Notes: a/The No Action Alternative in the short-term and long-term is the same as the existing situation.

b/Fixed costs and depreciation are assumed to remain constant.

Under the PA in the short-term, a reduction in the Resource Area employment based on the reduction in livestock grazing would occur. In the short-term, approximately 23 jobs in the range livestock industry would be lost due to the 9 percent decrease in AUMs. The remainder of the employment decrease would be distributed throughout the rest of the Resource Area economy. The total decrease in employment would represent a change of less than 1 percent to the regional economy. The range livestock operators would experience an 11 percent decrease in employment.

In the short-term, direct income would decrease by approximately $197,000. The range livestock industry would experience a decrease in direct income of $123,300. The remainder of the decrease would be distributed throughout the rest of the Resource Area economy. The total decrease in direct income would represent a change of less than 1 percent. The range livestock industry would experience an 11 percent decrease in direct income.

The reductions under this alternative would not change the structure of the Resource Area economy, however, the small general stores in the Resource Area region could experience a reduction in sales. This could be due primarily to reduction in employment and income by the range livestock industry.

Under the PA in the long-term, an increase in AUMs of approximately 12 percent from the 5-year average would occur. This adjustment would increase total receipts from ranching by approximately $505,000. Total receipts for the subsistence size operation would remain the same as the existing situation. Total receipts for the small operation would increase by $2,900, receipts for the medium operation would increase by $6,000, and receipts for the large operation would increase by $16,700.

Under this alternative, the BLM grazing permit value for borrowing purposes would remain at approximately 4 percent below the preference level. This would mean a loss of $989,000 in the BLM grazing permit value from preference and a corresponding decrease in the financial flexibility of the ranch operators.

In the long-term, an increase of 38 jobs to the Resource Area economy would occur. Twenty-eight jobs would be added to the range livestock industry, one to the other livestock industry, one to the construction industry, two to the transportation industry, one to the eating and drinking industry, three to the other retail industry, one to the lodging industry, and two to the other services industry. The Resource Area economy would experience a less than 1 percent increase in employment. The range livestock industry would experience a 13.5 percent increase in employment opportunities.

In the long-term, there would be a $238,000 increase in direct income. The increase in direct income for the range livestock industry would be $150,000, $2,000 to the other livestock industry, with the remainder of the increase being distributed throughout the Resource Area economy. The increase in direct income would be less than 1 percent to the Resource Area economy; however, the range livestock industry would experience a 13.7 percent increase in direct income.

Under this alternative, the BLM Las Cruces District would expend approximately $1.4 million for rangeland developments in the short-term. These rangeland developments would result in an additional 18 jobs and an increase of approximately $182,000 in direct income to the Resource Area economy. This action would increase employment and direct income in the Resource Area economy by less than 1 percent.

Approximately $816,000 would be expended for vegetation treatments in the short-term. This action would result in an additional 11 jobs and would increase direct income by approximately $104,000 in the Resource Area economy. This would increase direct income and employment opportunities by less than 1 percent in the Resource Area economy.

Summary

Under the PA in the short-term, there would be a 9 percent decrease in AUMs from the 5-year average. Total receipts for all ranch operations would be reduced by approximately $410,000. The Resource Area economy would experience a reduction in direct income and employment of less than 1 percent. The range livestock operators would experience an 11 percent decrease in employment and direct income. In the long-term, total receipts would increase for all operations by $505,000. All livestock operations would continue to operate despite poor financial returns.

The Resource Area economy would experience an increase in direct income and employment of less than 1 percent. The range livestock operators would experience an increase in employment of 13.5 percent and an increase in direct income of 13.7 percent.

No Action (NA) Alternative

Under the NA Alternative, the economic structure of the Resource Area economy would not be affected. The established economic trends between 1970 and 1982 would persist. Any changes that would occur would not be due to factors related to actions under the NA Alternative.

Under the NA Alternative, there would be a continuation of the current BLM Las Cruces District rangeland management program. Authorized livestock numbers would remain the same and would be adjusted if monitoring studies indicated a change in livestock grazing capacity. Total receipts for all operations would remain at approximately $7.8 million. Total direct income for the Resource Area economy would remain at approximately $274 million. Total employment would remain at 30,567 for the Resource Area economy.

Maximization (MAX) of Livestock Forage Production Alternative

Under this alternative in the short-term, the BLM Las Cruces District would expend approximately $4.5 million for rangeland developments. This action would result in an additional 60 jobs and an increase of approximately $581,000 in direct income for the Resource Area economy. This action would increase employment opportunities and direct income in the Resource Area economy by less than 1 percent.

Approximately $8.5 million would be expended for vegetation treatments. This action would result in an additional 113 jobs in the Resource Area economy. Total direct income would increase by approximately $1 million. This action would increase employment opportunities and direct income in the Resource Area economy by less than 1 percent.

In the long-term, AUMs would increase by 31 percent from the 5-year average. This adjustment would increase total receipts from ranching by approximately $1.5 million. Total receipts for the subsistence operation would increase by $1,600, total receipts for the small operation would increase by $5,400, and receipts for the medium and large operations would increase by $14,200 and $59,000, respectively. See Appendix K-3 for individual estimated costs and returns for representative ranch operations.

Under this alternative, the BLM grazing permit value for borrowing purposes would be approximately 12 percent above the existing preference level. This would mean an increase of $3.1 million in the BLM grazing permit value from preference, giving the ranch operators more financial flexibility.

In the long-term under the MAX Alternative, 115 jobs would be gained in the Resource Area economy. Eighty-four jobs would be added to the range livestock industry and two in the other livestock industry. The remainder of the increase in employment opportunities would be distributed throughout the rest of the economy. The total increase in employment would represent a change of less than 1 percent in the Resource Area economy. The range livestock industry would experience a 40 percent increase in employment.

In the long-term, there would be an increase of $715,000 in direct income in the Resource Area economy. The increase in direct income for the range livestock industry would be $448,000, $4,000 to the other livestock industry, and $2,000 to the other agriculture industry. The remainder of the increase in direct income would be distributed throughout the rest of the Resource Area economy. The Resource Area economy would experience an increase in direct income of less than 1 percent. Total direct income to the range livestock industry would increase by approximately 41 percent.

Enhancement of Other Resource Values (EORV) Alternative

Under the EORV Alternative in the short-term, any measurable shifts in employment patterns or unemployment rates would not occur. The BLM Las Cruces District would expend approximately $1.5 million for rangeland developments. This action would result in an additional 19 jobs and an increase of approximately $186,000 in direct income for the Resource Area economy. Total direct income and employment for the Resource Area economy would increase by less than 1 percent. Approximately $816,000 would be expended for vegetation treatments. This action would result in an additional 11 jobs and would increase direct income by approximately $104,000 in the Resource Area economy. This action would result in an increase in employment and total direct income to the Resource Area economy of less than 1 percent.

There would be an decrease of approximately 36 percent in AUMs from the 5-year average. This would reduce total receipts from ranching by approximately $1.5 million. Total receipts for the subsistence size operation would be reduced by $2,505 for the subsistence operations, $5,464 for the small operations, $17,079 for the medium operations, and $55,230 for the large operations.

The BLM grazing permit value for borrowing purposes would be reduced by approximately $11.3 million (45 percent below preference) and would result in a corresponding decrease in the financial flexibility of ranch operations.

Under this alternative, AUMs for two allotments would be eliminated. This would affect one operator in the subsistence operation and one operator in the small operation. The operator in the subsistence operation would be unable to continue livestock grazing since the operation is 100 percent dependent on public land. The operator in the small operation would incur a 37.5 percent reduction in total AUMs.

Under this alternative in the short-term, employment would be reduced in the Resource Area economy by 119 jobs. This would account for a less than 1 percent decrease in employment opportunities to the Resource Area economy. Eighty-seven jobs would be reduced in the range livestock industry. This would result in a 42 percent decrease in employment opportunities for the range livestock industry.

There would be a $737,000 reduction in direct income in the Resource Area economy. This would account for a less than 1 percent decrease in total direct income to the Resource Area economy. The reduction in direct income in the range livestock industry would be approximately $462,000. This would result in a 42 percent decrease in direct income to the range livestock industry.

Under this alternative in the long-term, the AUMs would be less than 1 percent below the 5-year average. This would decrease total receipts from ranching by approximately $37,000. Total receipts for the subsistence operations would decrease by $288, increase by $68 for the small operations, increase by $431 for the medium operations, and decrease by $2,696 for the large operations. The one operator under the subsistence operation discussed under the worst case situation would still be unable to graze on public land. The operator in the small operation would have a reduction in AUMs of 37.5 percent.

In the long-term, four jobs in the Resource Area economy would be lost (a decrease of less than 1 percent in the Resource Area economy) and the range livestock industry would decrease employment by 2 jobs (a decrease of less than 1 percent to the range livestock industry). Total direct income would decrease in the Resource Area economy by $19,484 (a decrease of less than 1 percent in the Resource Area economy), and the range livestock industry would decrease total direct income by $12,000 (a change of 1 percent to the range livestock industry).

The BLM grazing permit value for borrowing purposes would be reduced by approximately 15 percent. This would mean a loss of approximately $3.7 million in the BLM grazing permit value and a corresponding decrease in the financial flexibility of the ranch operators.

Summary

In the short-term, total direct income for the Resource Area economy would change to approximately $273 million, a decrease of approximately $737,000 from the existing $274 million. Total employment for the Resource Area economy would change to 30,448, a decrease of 119 jobs from the existing 30,567 jobs. Total receipts for all operations would be approximately $6.2 million, a decrease of approximately $1.5 million from the existing $7.8 million.

In the long-term, total direct income for the Resource Area economy would change to $274,145,660, a decrease of $19,484 from the existing $274,165,144. Total employment for the Resource Area economy would change to 30,563, a decrease of 4 jobs from the existing 30,567 jobs. Total receipts for all operations would be approximately $7.7 million, a decrease of approximately $374,000 from the existing $7.8 million.

Elimination of Livestock Grazing (ELG) Alternative

Under the ELG Alternative, small general stores in the Resource Area economy which depend somewhat on income derived from ranching would be affected. Significant, primary impacts would be on those livestock operators who are dependent on public land for grazing.

Under this alternative, elimination in permitted livestock grazing would reduce total receipts by approximately $4.4 million in the long-term. A temporary increase in livestock sales and income would occur as herds would be diminished and livestock sold. Maximum increases in livestock sales would not last longer than 2 years.

Total receipts for subsistence, small, medium, and large operators would decrease by $6,004; $14,310; $39,908; and $173,615, respectively. All operations, except the large operators, would incur a loss of net income, however, all ranch size categories would continue to meet all cash costs and operators would continue to live off their depreciation.

Under this alternative, livestock operators would be forced to sell, supplemental feed, or graze approximately 60 percent of the total AUMs which are dependent on public land for grazing on private or state lands. Some livestock operators, due to reduced income, would leave the livestock industry and seek non-ranch jobs and other sources of income. Some of the livestock operators and their families could relocate to find suitable employment. The continued operation of most ranches would depend upon their prior level of dependency on public land for grazing and their ability to meet all cash costs after individual adjustments in levels of grazing.

The average herd size for the subsistence operation would decrease to 17 Animal Units (AUs) from 44 AUs. The small operation's average AUs would decrease to 54 AUs from 124 AUs. This operation would be reclassified as a subsistence operation. The medium operation's herd size would decrease to 102 AUs from 277 AUs. This operation would be reclassified as a small operation. The average herd size for the large size operation would decrease to 598 AUs from 1,272 AUs. This operation would remain classified as a large operation; however, the change in AUs would significantly affect the profitability of this operation as well as the others. This discussion indicates what would occur to the average ranching operation only, and does not imply that the reclassification of ranching operations would occur to all operations for each ranch size.

Employment in the Resource Area economy would be decreased by 334 jobs, a decrease of 1 percent in the Resource Area economy. Employment in the range livestock industry would decrease by 168 jobs. The range livestock industry would experience an 81 percent decrease in employment opportunities.

Direct income in the Resource Area economy would decrease by $2 million accounting for a decrease in direct income of less than 1 percent in the Resource Area economy. The range livestock industry would decrease direct income by $893,000.

Under this alternative, a dramatic impact on BLM grazing permit valuations would occur. The elimination of 251,497 AUMs would result in a decrease of $25 million in BLM grazing permit values and a corresponding decrease in the financial flexibility of ranch operators. Under this alternative, the livestock operators would be unable to borrow money using public land AUMs.

Summary

Under the ELG Alternative, total direct income for the Resource Area economy would change to approximately $272 million, a decrease of approximately $2 million from the existing $274 million. Total employment for the Resource Area economy would change to 30,233, a decrease of 334 jobs from the existing 30,567 jobs. Total receipts for all livestock operations would be approximately $3.4 million, a decrease of approximately $4.3 million from the existing $7.8 million.

Proposed Special Designation Areas

Proposed Action (PA)

Gila Lower Box Riparian ACEC

Minor inconveniences and costs could occur to the permittee on Allotment 1078 due to the movement of cattle from one pasture to another. There would be a loss of approximately 5 percent of the total AUMs for seven months of each year on this allotment. Alternative grazing arrangements would need to be made for the displaced grazing use.

CHAPTER 4

CONSULTATION

AND

COORDINATION

CHAPTER 4

CONSULTATION AND COORDINATION

INTRODUCTION

This chapter summarizes the consultation and coordination conducted in preparation of the Draft Management Framework Plan Amendment/Environmental Impact Statement (MFP Amendment/EIS). A list of persons involved in the preparation of the MFP Amendment/EIS is provided in Table 4-1.

PUBLIC CONSULTATION, AGENCY COORDINATION, AND SCOPING ACTIVITIES

Scoping for the Las Cruces/Lordsburg MFP Amendment/EIS originated with the development of a Public Participation Plan, Issue Identification, and Planning Criteria for a Resource Management Plan (RMP) in January 1981. During the planning process, various Federal, state, and local agencies, interest groups, and individuals were contacted. These contacts were made to inform the public about the RMP planning process, to gather resource information, and to identify significant issues from the public to be considered during the planning process.

As required by BLM regulation (43 CFR Subpart 1601, 8/7/79), a general notice at the outset of the planning process which invites participation in the identification of issues and a notice inviting public comment on the planning criteria were accomplished through Federal Register Notices, news releases, Las Cruces District Newsletters, public meetings, and general notice letters. The scoping activities for the RMP are summarized in Table 4-2.

In early 1982, due to fiscal constraints, the scope of the RMP project was pared down to a MFP Amendment/EIS with three issues: Rangeland Management, Energy Minerals, and Wilderness Recommendations. The public was notified of the change in the Federal Register (January 29, 1982). The issue of wilderness recommendations, along with appropriate public involvement documentation, became the subject of a separate document. The Draft Environmental Assessment of Wilderness Study Areas in the Las Cruces District is available for review in the Las Cruces District Office.

The consultation, coordination, and scoping activities undertaken by the LCLRA specifically for the MFP Amendment/EIS are summarized in Table 4-3. Public contacts were coordinated by telephone, correspondence, and meetings between the various BLM Las Cruces personnel and representatives of other Federal, state, or local agencies.

Other consultation and coordination activities undertaken by the Las Cruces District included field trips with interested individuals and small groups and informal meetings or field trips with affected

TABLE 4-1

LIST OF PREPARERS

Name	EIS Responsibility	Education	Experience
Mary Austin	Team Leader	B.S., Agricultural Economics New Mexico State University	BLM - 4 yrs. Planning Coordinator
Bruce G. Call	Soils, ACECs	B.S., Agriculture (Range and Soil Science) New Mexico State University	BLM - 4 yrs. Range Technician Range Conservationist Soil Scientist USFS - 7 mos. Forestry Technician Soil Technician
Beverly Cochran	Social Conditions	B.A., M.A., Sociology and Psychology Texas Christian University Ed.D., Sociology and Psychology North Texas State University	BLM - 4 yrs. Sociologist Tarleton State University - 3 yrs. Professor - Sociology Sam Houston State University - 3 yrs. Professor - Sociology and Psychology North Texas State University - 3 yrs. Instructor - Sociology Texas Christian University - 1 yr. Instructor - Sociology
Karen Concho	Typist	A.A.; Senior, Government New Mexico State University Real Estate Certificate, Real Estate Institute, Albuquerque, NM	BLM - 3 yrs. Mag Card Operator Native American Program - 2 yrs. Office Personnel
Donita C. Cotter	Wilderness, Recreation, Visual Resources	B.S., Environmental Science Texas Christian University	BLM - 4 yrs. Wilderness Specialist
Donna Y. Gonzales	Typist	Junior, Business Administration New Mexico State University	BLM - 2 yrs. Clerk-Typist
Rena A. Gutierrez	Writer-Editor	B.A., Journalism/Mass Communications New Mexico State University	BLM - 4 yrs. Public Information Aid Clerk-Typist Writer-Editor
Steven C. Hamp	Climate, Water Resources, Other Land Uses, ROWs, Transportation	B.S., Geology and Sociology Illinois State University M.S., Watershed Management University of Arizona	BLM - 4 yrs. Hydrologist USFS - 2 yrs. Forest Technician
Kimberly A. Harrison	Editorial Assistant (Typing)	2 semesters - Biology Texas Lutheran College 1 semester - Art University of Texas at El Paso 1 semester - Secretarial Science El Paso Community College	BLM - 4 yrs. Clerk-Typist Planning Clerk (Typing) Editorial Assistant (Typing) El Paso Community College - 4 yrs. Registration Cashier Night Cashier/PBX Operator Accounts Payable File Clerk Secretary II
Pete M. Laudeman	Cultural Resources	B.A., M.A., Anthropology University of Arizona	BLM - 7 yrs. Archaeologist
Gerald Sanchez	Economics Conditions	B.B.A., Economics New Mexico State University	BLM - 3 yrs. Cooperative Ed. Trainee (Division of Administration) Support Services Supervisor Budget Analyst Regional Economist
Linda K. Seibert	Wildlife	B.S., Wildlife Science New Mexico State University B.A., Spanish (minor - Russian) San Jose State University	BLM - 7 yrs. Wildlife Biologist NMSU - 2 yrs. Library Assistant Santa Clara County - 2 yrs. Welfare Eligibility Worker

TABLE 4-1 (continued)

LIST OF PREPARERS

Name	EIS Responsibility	Education	Experience
Joseph I. Torrez	Mineral Resources and Geology, Topography, Air Quality	B.A., Geology New Mexico Highlands University	BLM - 6 yrs. Geologist NM State Highway Department - 5 yrs. Soils Testing/Surveying Sales - 1 yr.
Lenna Trujillo	Typist	B.A., Sociology Gallaudet, Washington, D.C. M.Ed., Education Western Maryland College	BLM - 1 yr. Clerk-Typist
Gilbert Valencia	Cartographic Technician		BLM - 5 yrs. Cartographic Technician
Beatrice A. Wade	Vegetation, Livestock Grazing	B.S., Forestry (minor - Wildlife Mgt.) 10 quarters - Range Ecosystem Mgt. 2 yrs. - Masters Thesis Work University of Florida	BLM - 5 yrs. Range Conservationist University of Florida - 5 yrs. Range Biologist (Research)

Background Preparers

Name	Education	Professional Experience
Louie Apodaca	Mayfield High School Las Cruces, New Mexico	1 yr. - Cartographic Aid
Louis Bevacqua	B.S., Range/Wildlife Management Texas Technical	3 yrs. - Range Conservationist
Gary Brandenburg	B.S., Forestry University of Montana	4 yrs. - Range Conservationist
Susan Britt	B.S., Wildlife Science New Mexico State University	2 yrs. - Range Conservationist
Mike Candelaria	B.S., M.S., Wildlife Science New Mexico State University	2½ yrs. - Range Conservationist
Steve Daly	B.S., Wildlife Science New Mexico State University	2 yrs. - Range Conservationist
Dino DeSimone	B.S., Range Management Arizona State University	6 mos. - Range Technician
Shane Everett	B.S., Soil Science University of Vermont	2 yrs. - Soil Scientist
Mark Hakkila	B.S., Wildlife Science New Mexico State University	9 mos. - Range Technician
Art Hayes	B.S., M.S., Wildlife Science New Mexico State University	9 mos. - Range Conservationist
Robert Hayes	B.S., Wildlife Science New Mexico State University	2 yrs. - Wildlife Biologist
Allegra Helfenstein	B.S., Biology Colorado State University	2½ yrs. - Surface Protection Specialist
Amy Heuslein	B.S., Biology Stephens College	3 yrs. - Wildlife Biologist
Terry Hicks	B.S., Biology (working on M.S., Soils/Range Management) New Mexico State University	2 yrs. - Soil Scientist
Elaine Hill	B.S., Wildlife Management Humboldt State University	3 yrs. - Wildlife Biologist
Randall Hill	B.S., Wildlife Management Humboldt State University	4 yrs. - Wildlife Biologist
Alan Kraus	B.S., Biology University of New Mexico M.S., Wildlife Science New Mexico State University	3 yrs. - Wildlife Biologist

TABLE 4-1 (concluded)

LIST OF PREPARERS
Background Preparers (continued)

Name	Education	Professional Experience
Susan Lobley	B.S., Wildlife Science New Mexico State University	1 yr. - Range Technician
Walter Lujan	B.S., Range Science New Mexico State University	7 yrs. - Range Conservationist
Helen Miller	B.A., Psychology University of New Mexico B.S., Wildlife Science New Mexico State University	1 yr. - Range Technician
Steve Park	B.S., Soil Science New Mexico State University	3 yrs. - Soil Scientist
John F. Parrish	B.S., M.S., Biology Midwestern University	3½ yrs.- Wildlife Biologist
Ray Sanchez	B.S., Range Science New Mexico State University	7 yrs. - Range Conservationist
Bill Schwebke	B.S., Range Science/Wildlife Management New Mexico State University	1 yr. - Range Conservationist
Thor Stephenson	B.S., Zoology University of Wyoming M.S., Range Science New Mexico State University	3 yrs. - Range Conservationist
Bob Tinguely	B.S., Wildlife Science New Mexico State University	1 yr. - Range Conservationist
Mike Whited	B.S., Soil Science University of Maine	2 yrs. - Soil Scientist
Karl Whitmore	B.S., Wildlife Science New Mexico State University	4 mos. - Range Technician
Bill Wier	B.S., Wildlife Science M.S., Interdisciplinary New Mexico State University	2 yrs. - Range Conservationist
Richard Wilborn	B.S., Biology New Mexico State University	3 yrs. - Wildlife Biologist

Support Personnel

Doug Coalson
Carol Crosby
M. Isabel Diaz
Marisela Galvan
Sylvia A. Garcia
Tom Gow
Efrain Holguin
Beverly Lewis
Bill Mathwig
Kathy Miles
Maria Luisa Rivas
Anna Sifuentes

CONTRIBUTORS AND REVIEWERS

Las Cruces District

Daniel C. B. Rathbun, District Manager
Robert Calkins, Associate District Manager
William J. Harkenrider, Jr., Area Manager, Las Cruces/Lordsburg Resource Area
Marvin James, Chief, Planning and Environmental Assistance
Tom Birch, District Range Specialist
Thomas C. Custer, District Geologist
Kenneth E. Holmes, District Wildlife Specialist
Jeff Jarvis, District Outdoor Recreation Planner
Ed Webb, Environmental Coordinator
Diana D. Garretson, Public Affairs Specialist
Benjamin A. Nunez, Range Specialist
Juan Padilla, Realty Specialist

New Mexico State Office

Bernie Chavez, Natural Resource Specialist
Bill Dalness, Geologist
Herb Garn, Hydrologist
Lynn C. Kincaid, Archaeologist
Teodoro B. Rael, Regional Economist
Verlyn D. Saladen, Soil Scientist
Jerry Townsend, Range Specialist
Lee L. Upham, Wildlife Biologist
John W. Whitney, Natural Resource Specialist

TABLE 4-2

SCOPING ACTIVITIES
LAS CRUCES/LORDSBURG RMP

Method of Contact	Date	Location
Federal Register Notice	1/23/81	
News Release	2/4/81 3/18/81	
Newsletter	2/4/81 3/2/81 4/2/81 5/1/81	
Public Scoping Meeting	4/8/81	Lordsburg
	4/15/81	Las Cruces
	4/22/81	Silver City
	4/29/81	Deming
Meetings		
Las Cruces District Grazing Advisory Board	3/26/81	Las Cruces
Las Cruces District Advisory Council	12/4/81	Las Cruces
	3/25/81	Las Cruces
	7/22/81	Las Cruces
General Notice Letter	3/13/81	
General Correspondence		
Office of the Governor	2/3/81	
Southwest New Mexico Council of Governments	2/19/81	
Southern Rio Grande Council of Governments	2/19/81	
San Carlos Apache Tribe	3/12/81	
Mescalero Apache Tribe	3/30/81	
Sierra Club - Southwestern New Mexico Regional Group	3/31/81	
Request for Comment (Booklet I)	4/1/81	
Public Input Analysis	6/16/81	
Request for Comment (Booklet II)	7/12/81	

Source: BLM Las Cruces District OFfice files, 1982.

TABLE 4-3

SUMMARY OF CONSULTATION, COORDINATION, AND SCOPING ACTIVITIES LAS CRUCES/LORDSBURG MFP AMENDMENT/EIS

Contacts	Date(s)	Location	Meeting/ Personal Communication	Telephone Call	Correspondence	Other
New Mexico Congressional Delegation						
U.S. Senator Pete Domenici U.S. Senator Harrison Schmitt U.S. Representative Joe Skeen	1/11/82	Las Cruces	X			
New Mexico State Agencies						
Agriculture Department	9/13/82		X			
	10/1/82	Las Cruces	X			
Council of Governments						
Southern Rio Grande Council	6/4/82			X		
Southwest New Mexico Council	5/11/82			X		
	7/23/82	Silver City	X			
Department of Finance and Administration						
Planning Division	5/11/82			X		
Historic Preservation Bureau	2/5/82	Santa Fe			X	
	8/3/82	Santa Fe		X		
	8/26/82	Santa Fe			X	
Energy Minerals Department						
Mining and Minerals Division - Oil Conservation Division	8/6/82			X		
Land Office	2/12/82	Santa Fe	X			
Natural Resources Department						
Administrative Services Division - Heritage Section	4/1/82				X	
	6/18/82			X		
	6/22/82			X		
	7/13/82			X		
Game and Fish Department	1/11/82	Las Cruces	X			
	6/14/82	Las Cruces	X			
	7/16/82	Las Cruces	X			
	9/82	Las Cruces	X			
	9/15/82		X			
	10/2/82	Las Cruces	X			
New Mexico State University						
Range Improvement Task Force	3/9/82	Las Cruces	X			
	9/7/82		X			
	9/28/82		X			
	10/5/82	Las Cruces	X			
	10/8/82	Las Cruces	X			
Range Staff	1/21/82	Las Cruces	X			District Manager spoke to NMSU class: "History of Land Patterns in New Mexico" - 5/18/82.
Agricultural Economics Staff			ongoing personal communication			
Entomology and Plant Pathology	9/29/82	Las Cruces	X			
Federal Agencies						
Department of Agriculture						
Forest Service	3/3/82	Carlsbad	X			
Department of Defense						
Department of the Army White Sands Missile Range	2/23/82	White Sands	X			
Department of the Interior						
Bureau of Indian Affairs	7/20/82			X		
Bureau of Land Management - Safford District	1/19/82		X			

TABLE 4-3 (concluded)

SUMMARY OF CONSULTATION, COORDINATION, AND SCOPING ACTIVITIES LAS CRUCES/LORDSBURG MFP AMENDMENT/EIS

Contacts	Date(s)	Location	Meeting/ Personal Communication	Telephone Call	Correspondence	Other
Federal Agencies (continued)						
Department of the Interior (continued)						
Bureau of Reclamation	7/20/82			X		
National Park Service	3/3/82	Carlsbad	X		X	
Minerals Management Service	7/20/82			X		
U.S. Fish and Wildlife Service	7/27/82				X	
	5/19/82			X		
Regional and Local Agencies						
Dona Ana County Manager	7/19/82	Las Cruces	X			
Dona Ana County Planners	2/22/82		X			
	7/19/82	Las Cruces	X			
Hidalgo County Commission	3/18/82	Lordsburg	X			
Grant County Manager	8/12/82	Lordsburg	X			
Hidalgo County Manager	8/13/82	Lordsburg	X			
Luna County Commissioners	7/23/82	Deming	X			
Livestock Related Organizations and Informal Groups						
Las Cruces District Grazing Advisory Board	1/14/82	Las Cruces	X			
	4/8/82		X			
	7/29/82		X			
New Mexico Farm and Livestock Bureau	4/15/82	Las Cruces	X			
	9/13/82		X			
Luna County Ranchers	2/2/82	Deming	X			
Grant County Ranchers	2/4/82	Silver City	X			
Hidalgo County Ranchers	2/25/82	Lordsburg	X			
New Mexico Cattle Growers Association	9/24/82	Dell City, TX		X		
Conservation Organizations (or Representatives)						
Mimbres Watershed Association	2/19/82	Silver City	X			
New Mexico Natural History Institute	2/19/82	Silver City	X			
Grant County Audubon Society	2/19/82	Silver City	X			
Sierra Club - Southwestern New Mexico Regional Group	3/6/82	Las Cruces	X			
New Mexico Wilderness Study Committee	2/19/82	Silver City	X			
Other						
Federal Land Bank	8/2/82			X		
Production Credit Association	7/28/82			X		

Source: BLM Las Cruces District Office Files, 1982.

permittees. The documentation of public contacts is located in the permanent documentation files and is available for review in the Las Cruces District Office.

In addition, an extensive mailing list has been assembled throughout the planning process for both the RMP and MFP Amendment/EIS to ensure that all Federal, state, and local agencies and interested groups and individuals are kept informed.

PUBLIC REVIEW OF THE DRAFT MFP AMENDMENT/EIS

In addition to all the agencies, organizations, and interest groups contacted during consultation, coordination, and scoping activities (See Tables 4-2 and 4-3), the Draft MFP Amendment/EIS will be sent to and comments requested from:

Congressional Delegation and New Mexico State Legislators

- U.S. Senator Jeff Bingaman
- State Senator Frank O. Papen
- State Senator J.J. (Jimmy) Rogers
- State Senator I.M. Smalley
- State Senator Ben Altamirano
- State Representative Thomas P. Foy
- State Representative Ralph D. Hartman
- State Representative G. McSherry
- State Representative Murray Ryan
- State Representative Ruben N. Smith
- State Representative Mary L. Thompson
- State Representative Mary Tucker
- State Representative Brent Westmoreland

New Mexico State Agencies

- Agriculture Department
  - Livestock Board
- Bureau of Mines and Mineral Resources
- Commerce and Industry Department
  - Economic Development Division
- Department of Finance and Administration
  - Office of Cultural Affairs
    - Museum Division
  - Planning Division
    - Clearinghouse/Coordination Bureau
- Energy and Minerals Department
  - Energy Resource and Development Division
- Governor's Office
- Health and Environment Department
  - Environmental Improvement Division
- Highway Department

New Mexico State Agencies (cont.)

- Land Office
  - Commissioner's Office
- Natural Resources Department
  - Forestry Division
  - Park and Recreation Division
  - Soil and Water Conservation
- State Engineer/Interstate Stream Commission
- State Police
- Universities
  - Eastern New Mexico University
  - Institute of Mining and Technology
  - New Mexico State University
    - Range Improvement Task Force
  - University of New Mexico
  - Western New Mexico University

Federal Agencies

- Advisory Council on Historic Preservation
- Department of Agriculture
  - Agricultural Stabilization and Conservation Service
  - Farmers Home Administration
  - Office of Environmental Quality
  - Science and Education Administration
    - Jornada Experimental Range
  - Soil Conservation Service
- Department of Defense
  - Department of the Air Force
    - Holloman Air Force Base
  - Department of the Army
    - Corps of Engineers
    - Fort Bliss

Federal Agencies (cont.)

Department of Energy
Department of the Interior
  Bureau of Mines
  Geological Survey
Department of Justice
  Immigration and Naturalization Service
    Border Patrol
Department of Transportation
Department of the Treasury
  U.S. Customs Service
International Boundary and Water Commission

Regional and Local Agencies

Chamber of Commerce, El Paso
Chamber of Commerce, Las Cruces
City Manager, Deming
City Manager, Lordsburg
City Manager, Silver City
County Agent, Dona Ana County
Dona Ana County Commissioners
Elephant Butte Irrigation District
El Paso County Commissioners
Grant County Commissioners
Grant County Extension Service
Hidalgo County Extension Service
Jornada Resource Conservation District
Luna County Extension Service
Luna County Manager
Mayor, City of Anthony
Mayor, City of Bayard
Mayor, City of Central
Mayor, City of Deming
Mayor, City of El Paso
Mayor, City of Hurley
Mayor, City of Las Cruces
Mayor, City of Lordsburg
Mayor, City of Silver City
Mayor, Village of Hatch
Southeast New Mexico Economic Development District
Southwest New Mexico Resource Conservation District
New Mexico Border Commission

Livestock Related Organizations

Sierra County Farm and Livestock Bureau
Southwest Livestock Grazing Association

Professional Societies

American Fisheries Society
New Mexico Wildlife Society
Society of American Foresters, New Mexico Chapter
Society of Range Management, New Mexico Chapter
Soil Conservation Society
Wildlife Society

Texas State Agencies

Budget and Planning Office
El Paso Community College
Office of the Governor
Texas Air Control Board
Texas Historical Commission
Texas Parks and Wildlife Department
Texas Tech University
University of Texas at El Paso

Arizona State Agencies

Arizona Game and Fish Department
University of Arizona

Conservation Organizations

Ada County Fish and Game League
Albuquerque Archaeological Society
Albuquerque Environmental Center
Albuquerque Geological Society
Albuquerque Wildlife Federation
American Wilderness Alliance
Central New Mexico Audubon Society
Dona Ana County Association of Sportsmen
Dona Ana County Historical Society
Earth First!
El Paso Archaeological Society
El Paso Trans-Pecos Audubon Society
El Paso Wilderness Preservation Committee
Friends of the Earth
Human Systems Research
Izaak Walton League
Luna County Historical Society
Mesilla Valley Audubon Society
National Council of Public Land Users
National Speleological Society
National Wildlife Foundation
Natural Resources Defense Council

Conservation Organizations (cont.)

Nevada Outdoor Recreation Association
New Mexico Association of Natural Resources Conservation Districts
New Mexico Citizens for Clean Air and Water
New Mexico Conservation Coordinating Council
New Mexico Ornithological Society
New Mexico Wilderness Newsletter
New Mexico Wildlife Federation
Oregon Environmental Council
Public Land Council
San Andres Refuge
Southwest Research and Development Company
Speleological Society
Texas Archaeological Society
The Wilderness Center
Wildlife Management Institute
Wilderness Society

Other Groups

Albuquerque Jeep Herders Association
Albuquerque Off-Road Runners, Inc.
Boy Scouts of America, Yucca Council
Deming Gem and Minerals Society

Other Groups (cont.)

Dona Ana County Association of Sportsmen
Gemcrafters and Employers
Grant County Rolling Stones
Hot Springs Gun Club
Jets Radio Club
Jim Huff's Four Wheel Drive Center
Las Cruces Four Wheelers
Las Cruces Motorcycle Club
Las Cruces ORV Club
Mesilla Valley Grotto
Motorcycle Association of New Mexico
New Mexico Association of Environmental Education
New Mexico Oil and Gas Association
New Mexico Radio Communications Department
Picacho Gun Club
Prairie Dawgs Motorcycle Club
Rio Grande Rough Riders
Sierra County Miners Association
Sierra Rock Club
Southwest Mountaineers
Sunshine Valley Garden Club
University of New Mexico Mountaineering Club
Woodward-Clyde Consultants

Individuals

Copies of the Draft MFP Amendment/EIS will be sent to all permittees and all other individuals on the Las Cruces/Lordsburg Resource Area mailing list.

ALTERNATIVES CONSIDERED BUT NOT ANALYZED

Two alternatives were considered but not analyzed. One alternative was the "No Energy Minerals Leasing Alternative." This alternative was considered to be unrealistic when the energy needs of our nation were taken into account.

The second alternative was the "No Wilderness Alternative." To analyze this alternative in the Draft MFP Amendment/EIS would have been a needless repetition of data contained in another document, the Draft Environmental Assessment of Wilderness Study Areas in the Las Cruces District (scheduled for release in 1983).

HEARINGS

Public hearings will be held on the Draft MFP Amendment/EIS. Notice for dates and times for these hearings will be announced in advance in the news media and the Federal Register.

APPENDICES

APPENDIX A
RANGELAND CONSULTATION POLICY

APPENDIX A

NEW MEXICO BUREAU OF LAND MANAGEMENT
RANGELAND CONSULTATION POLICY
SECTION 8 PL-95-514

Purpose: Section 8 of PL-95-514 specifically requires consultation, cooperation, and coordination with lessees, permittees and landowners, the district grazing advisory boards and any state agencies, hereinafter referred to as the target group, involved in the development, revision or evaluation of allotment management plans. It is the intent of the Bureau of Land Management, New Mexico, to expand the concept of consultation, cooperation, and coordination into all phases of the grazing programs and, thus, compliment the congressional intent set forth in PL-95-514.

Introduction: The procedures apply specifically to the target group, but also apply to other interested publics such as the district advisory council, the New Mexico Range Improvement Task Force, and other interested parties, as well as other land administering agencies where applicable. These procedures consist of seven phases and are intended to ensure compliance with Section 8 of PL-95-514. These phases are:

I. Preplanning.

II. Inventory and Inventory Related Studies.

III. Development of Resource Management Plan (RMP) and Environmental Impact Statement (EIS).

IV. Rangeland Management Program Documents Following Grazing Environmental Impact Statements.

V. Livestock Adjustments, Grazing Systems Allotment Management Plans (AMPs), Revisions or Evaluations.

IV. Interim Range Studies Prior to Grazing Systems or AMP Implementation.

VII. Documentation.

Phase I
Preplanning

A. The District Manager or his representative will contact the target group at the beginning of the preplanning analysis to request their input into the identification of issues. Contacts will be made by certified mail to ensure proper documentation.

B. The District Manager or his representative will then meet with the target group or informally on a one-to-one basis with each group and each owner-operator to ensure that their ideas and concerns are considered.

C. Following steps A and B, all affected parties will be furnished, by certified mail, a summary of issues for their review and comment before finalization. A final revision will be mailed to each party.

Phase II
Inventory and Studies Related to Inventories

A. The District Manager or his representative will notify the target group, by certified mail, of the inventories and inventory related studies to be conducted with a proposed time frame.

B. Prior to the initiation of each inventory or inventory related studies, the target group will be notified, by certified mail, of the inventories and inventory related study.

C. Prior to the beginning of an inventory, or inventory related studies, the District Manager or his representative will notify the target group, by certified mail, to request their participation.

D. All inventory or study teams will stop at the ranch headquarters on the first day of the inventory or study. If the allottee is absent, a note will be left indicating the work being done and the locations of each crew. (See Section VII, Documentation.)

Phase III MFP-RMP
EIS Development

A. Consultation and coordination with the target group, along with interested publics, is required (see 43 CFR 1601.4) and will be carried out as stated in 43 CFR 1601.3, public participation.

B. The District Manager or his representative shall make contacts with the target group to request their involvement during the allotment analysis process (II.C. and D.). The results of the various inventories and studies, i.e., forage availability, proposed livestock adjustments, wildlife habitat needs, socio-economic needs, watershed needs, etc., will be discussed with these participants during this contact. The allotment analysis review will include discussion on the needs for AMP vs. no AMP, design of grazing systems, locating rangeland improvements and land treatment potential, etc.

Phase IV
Rangeland Management Program Document

The District Manager or his representative shall make contact with state agencies, district grazing advisory boards and the New Mexico Range Improvement Task Force within 90 days following the filing of a final EIS to review the draft Rangeland Management Program Document. The thrust of this phase will be to seek mutual agreement on the Rangeland Management Program Document. In the event of disagreements, further consultation may be necessary with the district advisory council. It is essential that this phase be conducted in an atmosphere of mutual trust, coordination, and consultation, since all subsequent range related actions will hinge on this document.

Phase V
Livestock Adjustments, Grazing Systems, Allotment Management Plans, Revision or Evaluation

A. Prior to the implementation of specific livestock adjustments, AMPs, grazing system or rangeland improvement programs, the target group will be contacted by certified mail, asking them to what extent they wish to be involved.

B. Individual allottees and the State Land Commissioner will be contacted prior to each adjustment of grazing use and in the development, revision, or evaluation of each AMP or other livestock management considerations.

C. The target group will be periodically informed and will be invited to review the progress at any time.

D. In those situations where BLM has issued proposed decisions and protests have been filed, where the allotment includes state land, the State Land Office will be advised and will be invited to participate fully in all meetings or actions pertinent to the proposed decision and subsequent protest.

E. In the course of consultation between the allottee, State Land Commissioner, and BLM regarding initial stocking rates following a grazing EIS, if an agreed upon stocking rate cannot be reached and after the issuance of a proposed decision, and the filing of a protest by the allottee, the New Mexico Range Improvement Task Force will be asked to review the allotment to assist in arriving at an acceptable stocking rate.

F. Either party may terminate the agreement as to paragraphs D and E above upon ten (10) days written notice.

Phase VI
Interim Range Studies Prior to Grazing Systems AMP Implementation

Contact will be made with the target group informing them of the intent and procedure to be used in establishing interim range studies. Use the contact procedure identified in II.C and D.

Phase VII
Documentation

A. Documentation of all contacts whether by mail, in person, by telephone, etc., is mandatory. Documentation shall be kept in chronological order and properly filed.

B. During inventories or studies, the area manager will maintain a daily log or diary indicating pertinent information, such as who worked where, hours spent on quality control with each team, contact with the public, etc.

C. All information is available at the district office for review. Summary of study data will be made available upon request.

APPENDIX B
VEGETATION

APPENDIX B-1

GUIDELINES FOR VEGETATION TREATMENTS

Specifics on the methods to be used during the application of herbicides are as follows.

1. Aerial applications of liquid herbicides would make use of aircraft with positive shutoff spray systems, special drift reduction nozzles, and spray mix adjuvants to apply herbicides to the specific target areas. Aerial applications would be accomplished under a contract to be let through competitive bidding processes. These applications would take place between mid-May and the first of July.

2. Aerial applications of granular herbicides would also make use of aircraft with a positive shutoff application chute. All aerial dispersion would be accomplished by contractors. These herbicide applications could take place anytime during the year depending on research recommendations.

Policies and laws that would be followed in the proposed brush control with herbicides program are:

1. Environmental impacts would be identified through a site-specific environmental assessment and measures taken to mitigate potentially adverse environmental impacts for each specific treatment location.

2. Programs would be reviewed with user groups, interested organizations, and the general public.

3. Only Federally registered herbicides would be used on public land except as authorized by Section 24.c., Public Law 92-516, the Federal Environmental Pesticide Control Act of 1972. Section 24.c. provides for state registration of certain herbicides for local needs within the state. Any herbicide proposal planned under a state registration would include a copy of the state label.

4. Tank mixes of herbicides may be approved if: such mixture is provided for on one or more labels of Environmental Protection Agency (EPA) registered products; provided for under a state registration; or if the tank mix has been tested and has a written recommendation by an Agricultural Experiment Station or the State Department of Agriculture. The herbicides recommended in the mixture must be applied at a dosage rate not to exceed the label instructions for use of any single product for the same target species and must not be specifically prohibited from mixing on either label. Each tank mix proposal must be accompanied by appropriate labels or a written recommendation.

5. On May 5, 1975, EPA announced the initiation of the Pesticide Enforcement Policy Statements (PEPS) series. These statements are published in the Federal Register and are intended to clarify EPA's policy regarding the enforcement of the Federal Insecticide, Fungicide and Rodenticide Act. PEP No. 1, published May 5, 1975, and September

17, 1975, allows for the use of a registered herbicide at less than the label dosage if such use is recommended in writing by a knowledgeable expert.

6. Integrated brush control methods which may combine chemical, manual, mechanical, or biological control techniques will be used where they meet the objectives of the project and minimize the adverse impact of brush control.

7. All proposed use of herbicides on public land would be reviewed for approval in advance by the Bureau's Washington, D. C. office.

8. Federal and state agencies with responsibilities for the environment, public health, and fish and wildlife would be informed of programs and cooperative measures developed when necessary.

9. Only properly trained or licensed personnel would handle and use herbicides on public land. This includes applications by permittees, grantees, or licensees. At least one member of the application crew and the BLM on-the-ground supervisor must be a certified applicator.

10. All individuals associated with the handling or application of herbicides on public land would be familiar with emergency procedures to be used in case of a herbicide spill.

There would be specific measures included in the design of each proposed herbicide project in order to minimize adverse impacts on the environment. They include the following:

1. On herbicide application projects conducted directly by Bureau personnel, an employee holding a valid herbicide application certification would monitor and supervise the project. Work done by contractors would be carried out by individuals having a valid state certification.

2. Contracts for application would require that the intake operation of water for mixing shall be arranged so that an air gap or reservoir will be placed between the live water intake and the mixed tank to prevent any backflow of chemical into the water source.

3. Contracts for application would require that contractors not wash out any spray tanks in or near any streams or dispose of any chemical containers on the contract area.

4. During aerial spraying, spray would be turned off at the end of spray runs and during the time when a turn is being made to start another spray run. Initial spray swaths along buffer strips or other areas to be protected would be made parallel to these areas before spraying commences on the rest of the project area.

5. Mixing and loading operations would take place in an area where an accidental spill would not flow into a stream or body of water.

6. Contained surface waters such as dirt tanks, drinking troughs, etc., would be protected by a buffer strip or could be covered to eliminate surface water contamination. A buffer strip of 1,500 feet adjacent to perennial streams would be established. This would apply to areas adjacent to the perennial streams, ranch houses, known locations of threatened or endangered plants, identified cliffs, nests of birds of prey (where they cannot be protected), or major ephemeral drainages to surface water resources.

7. To minimize drift and volatilization, aerial applications of all the liquid herbicides proposed for use would be confined to periods when wind speed is less than seven miles per hour, air temperature is under 85° F., precipitation is not occurring or imminent, and air turbulence would not affect normal spray patterns. Label directions would be followed if they require additional restrictions. Low volatile formulations would be used.

8. Daily measurements of weather conditions would be made by trained personnel at spray sites during liquid application. Additional measurements would be made at any time that a weather change appears to be taking place which could jeopardize safe placement of the spray on the target area.

9. Spray aircraft would normally be required to fly at an air speed of less than 100 mph and less than 50 feet above the vegetation unless obstructions are encountered. Nozzle size and pressure would be designed to produce droplets with a diameter of 200-500 microns. All aerial nozzles would be equipped with automatic shutoff devices to prevent loss of herbicide along nonspray flight routes. Spray mixtures would contain drift reduction adjuvants where they would be effective.

10. During air operations, a radio network would be maintained which links all parts of the project. Reconnaisance flights would be made before spraying begins to orient pilots as to locations of sensitive areas which are adjacent to spray targets.

11. All livestock would be removed from treated pastures prior to aerial spraying.

12. Grazing would not be permitted in treated pastures for a minimum of two growing seasons or 16 months following treatment. Applications would be in strict conformity with label instructions. Each applicator would be trained in the correct operation of spray equipment, prevention of plumbing leaks, safe handling and mixing of herbicides, control of application rate, and would be supervised by licensed personnel.

The overall responsiblity for monitoring environmental impacts of chemical herbicides rests with the EPA (Public Law 92-516, Sec. 20). Research on environmental impacts of herbicides to animals, water, soil, and plants is conducted by chemical companies as a prerequisite to registration with the EPA. Additional research is conducted by Federal agencies and universities. The Bureau would keep abreast of these research findings and adjust its proposed herbicide applications as indicated by research results and EPA recommendations.

Vegetative response would be monitored with appropriate photo-stations and vegetation sampling transects being established prior to treatment. On-site data evaluating herbicide effectiveness and the resulting secondary succession would be collected to continually improve the brush control process.

The safe use of herbicides includes precautionary measures to prevent accidental spills. The following precautions describe the measures that would be used to reduce the chance of such accidents, and the emergency action which would be required if an accidental spill should occur. The applicable Federal regulations concerning the storage and disposal of herbicides and herbicide containers would be followed. These are described in the EPA "Regulations for Acceptance and Procedures for Disposal and Storage," Federal Register, May 1, 1974, pages 15236 through 15241.

During Transportation:

1. It is essential to prevent damage to containers so that leaks do not develop, care would be exercised so that the containers are not punctured or ruptured and so that the lids or caps are not loosened.

2. Precautions would be taken in the loading and stacking of herbicide containers on the transporting vehicle to ensure that containers are tied down so that they do not fall when the vehicle moves.

3. Open containers would never be transported. Containers, which are partially empty, would be securely resealed before transport.

4. After transportation, all herbicide containers would be inspected for damage and leaks, and the vehicle must be carefully examined for contamination.

During Application:

1. Spraying schedules would be arranged so that poor visibility before and shortly after sunrise and sunset would not seriously affect the safety of the pilot.

2. Spraying from a higher altitude would be allowed where steep terrain in the spray area would make it hazardous to spray at the specified contract heights.

3. The pilot would be instructed to stop spraying when, in his own judgment, conditions are too hazardous.

4. The pilot would be instructed to fly at a height above the ground that would produce effective treatment results. In no case should the minimum flight height be less than 5 feet.

5. Pilots would be cautioned about dangers such as topographic features. Project maps would be reviewed with each pilot, paying particular attention to landing strips, areas being sprayed, and approaches to and from those areas.

6. Pilots would be cautioned as to the location of telephone and electric lines near any landing strip which would be used.

7. If an aircraft crashes, the pilot's clothing would be checked to see if he has been splashed with herbicide. If so, and if he is not seriously injured, he would be washed several times with soap.

8. Should a pilot be injured and taken to a hospital or doctor, they would be informed that the pilot has been exposed to a herbicide and they would be provided with any herbicide label information that is available.

Tanker Precautions:

1. An air gap or reservoir between the water source and the mixing tank would be required. A separate portable pump may be used.

2. Spray solutions would be mixed away from streams, drains, or ditches leading to streams where spills could reach a stream if they occurred.

3. The movement of loaded herbicide tankers would be planned to minimize travel adjacent to streams.

If Spills Occur:

In the event of a spill, the project inspector or crew foreman would immediately implement measures to contain the herbicide. The following individuals would be notified as soon as possible: 1. the area manager, 2. the district manager, 3. the State Office herbicide-use coordinator, and 4. the New Mexico Department of Agriculture, herbicide regulation division.

1. Herbicides would be contained by diking and collecting pools. The location and availability of earthmoving equipment close to the project would be noted.

2. The EPA would be notified immediately if a major spill should occur.

3. The surrounding area would be inspected for contamination.

Criteria used in the selection of herbicides are based on guidelines and policies issued by the U.S. Department of the Interior. These criteria are briefly outlined in the following discussion.

1. The chemical proposed for use is not prohibited by the U.S. Department of the Interior.

2. Use of any chemical is aimed at a specific brush problem and involves both minimum strength and frequency of application.

3. Chemical herbicides would not be used alone when nonchemical or integrated chemical and nonchemical techniques offer an environmentally feasible alternative.

4. No herbicide would be used when there is evidence to show that:

   a. Water quality would be degraded.

   b. Hazards exist that would unnecessarily threaten fish, wildlife, their food chain, or other components of the natural environment.

5. Herbicides proposed for use must be registered by the EPA according to Public Law 92-516. This law requires a determination by EPA that the chemical "will perform its intended function without unreasonable adverse effects on the environment." If registration of any herbicide is revoked or modified for rangeland use by the EPA, use of that herbicide by the Bureau will be terminated or modified accordingly.

METHODOLOGY - MODIFIED SOIL - VEGETATION INVENTORY AND DIGITIZING

Instructions for completing the modified soil-vegetation inventory, which was used for completing the vegetative inventory in the Las Cruces/Lordsburg Resource Area, are described in BLM Manual 4412.14.

This procedure can be described in six distinct phases: typing or mapping, transecting, digitizing, cross-correlation, compilation, and computation.

Typing or mapping was done by soil-vegetation units on aerial photos. Vegetation was typed according to dominant species aspect. These units were then further divided to delineate areas with similar plant species composition and density. The final mapping unit was an area of similar vegetation occurring on the same soil and range site. These units were then called Site Write-up Areas (SWAs).

Sampling of each SWA was done by transects traversing the soil-vegetation unit in a manner which obtained a representative sample of the SWA. A minimum of one 100-point pace transect was done on each SWA. Information recorded at each 100 points along the line include basal hits identifying ground cover as live vegetation, litter, small rock, large rock, and bare ground. Live vegetation was identified by plant species. Hits were identified by a notch on the toe of the sole of the transector's boot, 1/8 inch wide and 1/16 inch deep. Canopy vegetative cover, if present, was recorded up to three levels above the boot.

Information on vegetation production was obtained at three evenly spaced plots across the SWA along the transect line. Weight-estimate plots of 9.6 or 96.0 square feet were used. At least one of the three plots were clipped and weighed. Green weight in grams for each plant species occurring in the plot was recorded. Adjustment factors used to convert green weights to dry weights were determined from samples collected during the inventory, air dried and percentages of dry weight to green weight calculated.

Compilation of acres by land status for each SWA, allotment, range site, vegetative subtype, and condition class was done through the BLM digitizing system. Land status was transferred to U.S. Geological Survey (USGS) topographic maps and entered into the system as Overlay 1. Allotments and SWAs were entered on consecutive overlays. The digitizing system computed acres by superimposing these overlays to give acres by land status, SWA, and allotment or a combination of these. This system was further refined with cross-correlation programs so acres could be retrieved by range site, vegetative subtype, and condition class.

Vegetative mathematical computations were done by the BLM computer system. The first calculation converted green weight in grams to dry weight in pounds. Adjustments were made when plants species were unavailable for livestock grazing use. A phenological adjustment factor was used to convert all field data to maximum production for the entire growing season. A utilization adjustment factor was made to compensate for any grazing use made on plants prior to the time of the field sampling. The final calculations computed total production of each vegetative species in pounds per SWA.

An analysis of the final calculated data indicates some inconsistency in pounds of vegetative production between areas of similar type vegetation with similar species composition and density. This inconsistency was most noticeable in areas where the vegetation grows in patterns which are not uniform, primarily dune type mesquite vegetation.

This inconsistency is attributed to plot size and number of plots sampled. Insufficient number of samples or size of the area sampled would tend to overestimate the production as often as it would underestimate the production.

Because of the indicated inconsistencies, forage production data derived from the survey was not used for determining grazing capacity on individual allotments. It was, however, used as a basis for describing the existing environment and assessing the impacts on the proposed action and various alternatives. This assessment was done by averaging numerous numbers from the various range sites and vegetative subtypes. The averaging process would eliminate most of the inconsistencies of overestimation or underestimation which existed in the field data.

METHODOLOGY - FORAGE VALUE CLASS

The forage value ratings were determined using procedures described in BLM Instruction Memo No. 74-120 with certain modifications. The criteria relative to soil surface factors were omitted and only those pertaining to quality and quantity of the vegetation were considered.

Major plant species in the Las Cruces/Lordsburg Resource Area were classified into three categories: desirable, intermediate, and least desirable. This classification was based on palatability and productivity, dominance under climax or near climax conditions, longevity of the species, and the importance of the species to improving rangeland conditions.

Standards used to determine forage value ratings are as follows:

1. Good condition. Composition is 40 percent or more of both desirable and intermediate species with at least 20 percent made up of desirable species.

2. Fair condition. Composition is 15-39 percent of desirable and intermediate species with 5 or more percent made up of desirable species. Also composition is 60 percent or more of both desirable and intermediate species with less than 5 percent desirables.

3. Poor condition. Composition is less than 15 percent desirable and intermediate species.

Vegetation has different values for different kinds of grazing animals; what may be called good for one animal species may not be for others. The plant species shown in the desirable and intermediate category below are for cattle only. Major plant species not shown were placed in the least desirable category.

APPENDIX B-3 (concluded)

DESIRABLE

Grasses

Sideoats grama
Black grama
Blue grama
Hairy grama
Purple grama
Bermuda grass
Arizona cottontop
Plains lovegrass
Tanglehead
Curly mesquite
Junegrass
Wolftail
Sand muhly
Arizona muhly
Mountain muhly
Mesa muhly
Bush muhly
Green spangletop
Arizona panic grass
Vine-mesquite
Spike dropseed
Mesa dropseed
Sand dropseed
Southwestern needlegrass
New Mexico feathergrass

Shrubs and Half Shrubs

Fourwing saltbush
Desert buckbrush
Mountain mahogany
Wright buckwheat
Winterfat

INTERMEDIATE

Grasses

Bluestem
Little bluestem
Cane bluestem
Silver bluestem
Rothrock grama
Fingergrass
Windmill grass
Saltgrass
Spike pappusgrass
Tobosa
Bullgrass
Spike muhly
Switchgrass
Bottlebrush squirreltail
Alkali sacaton
Hall's panic grass
Giant dropseed
Sacaton
Slim tridens
Plains bristlegrass

Shrubs and Half Shrubs

Sand sagebrush
Fringed sagebrush
Tubercled saltbush
Obovate-leaf saltbush
False mesquite
Buckbrush
Feather peabush
Torrey ephedra
Mexican tea
Apacheplume
Cliff fendlerbrush
Wright silktassel
Range ratany
Bull cods

APPENDIX B-4

METHODOLOGY - ECOLOGICAL CONDITION CLASS

The ecological condition on areas within a range site was determined by comparing the present plant community with the climax plant community. Potential plant communities on all range sites are described in Technical Guides available from the USDA Soil Conservation Service (1980).

Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax community (SCS 1976). The four classes are:

Rangeland Condition Class	Percentage of present plant community that is climax for the range site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

Percent composition of each species for the existing plant community cannot exceed the percent composition of the same species in climax, as shown in the guide for the climax plant community. The amount of all climax species not in excess of that shown on the guide is totaled to indicate the relative ecological condition rating. This rating will be between 0 and 100. An example of the calculations for a loamy range site occurring in the Western Plateau MLRA is shown below.

Plant	Maximum Percent Composition	Present Percent Composition	Adjusted Percent Composition
Aristida	2	3	2
Sideoats grama	10	1	1
Blue grama	30	87	30
Apacheplume	0	6	0
Prickly pear	3	2	2
			35

The total adjusted rating was 35 which indicates a fair ecological condition class rating. The primary reason for a low rating of 35 for this site was the lack of other species which would occur in a climax plant community.

No adjustments were made for total weight of forage produced compared with the potential, therefore, the condition class ratings used are not based upon the variations in total production for any specific site and only reflect plant species compositions.

APPENDIX B-5

METHODOLOGY - APPARENT TREND

The trend in rangeland condition can only be determined by measuring changes over time. Generally, the longer the time the greater the confidence in trend determinations. However, in some cases, it may be necessary to establish what the existing trend is before long-term trend data are available. The apparent trend study is used to determine the direction of change with a single observation. Apparent trend is an ESTIMATE of current trend based on indicators of current changes occurring in the vegetation and soil condition. The five factors involved are vegetation (either seeded or native), vigor, seedlings, surface litter, and soil movement. A numerical rating is assigned for each factor and a composite rating is determined. The Observed Apparent Trend Worksheet, Form AT-1 is used to record this data (See Illustration 2-1).

Form AT-1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OBSERVED APPARENT TREND
WORKSHEET

Planning Unit ______
Allotment ______
Location ______
Examiner ______
Vegetative Type ______
Date ______

SWA No. ______
Transect No.

		Possible Points	Rating
1.A. VEGETATION SEEDED	More than 50 percent of the total vegetation is composed of the seeded species. If shrubs are present, the seeded species occur mainly in open spaces between shrubs. Undesirable annual vegetation is absent or nearly so.	6	
	25 to 50 percent of the vegetation is composed of the seeded species. If shrubs are present, some seeded species occur in open unprotected areas. Limited amounts of undesirable annual vegetation are present.	4	
	Less than 25 percent of the vegetation is composed of the seeded species. Seeded species are generally protected by shrubs or rocks. There is an over abundance of undesirable annuals and/or shrubs.	2	
1.B. VEGETATION NATIVE	More than 50 percent of the total vegetation is composed of the potential natural vegetation. An evenly distributed mixture of grasses, forbs, and shrubs are present. Major native forage grasses occur in open, unprotected areas. Undesirable annual vegetation is absent or nearly so. Browse species showing no hedging.	6	
	25 to 50 percent of the vegetation is composed of the potential natural vegetation. Moderate variations of grasses, forbs, and shrubs exist. Some major native forage grasses occur in open, unprotected areas. Limited amounts of undesirable annual vegetation are present. Browse species showing moderate hedging.	4	
	Less than 25 percent of the vegetation is composed of the potential natural vegetation. Poor variation exists among grasses, forbs, and shrubs, with an over abundance of undesirable annuals or shrubs. Major native forage species are generally protected by shrubs or rocks. Browse species showing heavy hedging.	2	
2. VIGOR	Desirable grasses, forbs and shrubs are vigorous showing good health. These plants should have good size, color, and produce abundant herbage.	10	
	Desirable grasses, forbs, and shrubs have moderate vigor. They are medium size with fair color and producing moderate amounts of herbage, some seed stalks and seedheads are present.	6	
	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seedheads almost non-existent except in protected areas.	2	
3. SEEDLINGS	There is seedling establishment of desirable grasses, forbs, and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.	10	
	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.	6	
	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.	2	
4. SURFACE LITTER	Surface litter is accumulating in place.	5	
	Moderate movement of surface litter is apparent and deposited against obstacles.	4	
	Very little surface litter is remaining.	3	
5. SOIL MOVEMENT	None or slight visual evidence of soil movement. No exposed roots.	5	
	Moderate movement of soil particles visible. Some plants have roots exposed.	3	
	Movement occurs with each event. Soil and debris deposited against minor obstructions. Terracing may be present. Many plants have roots exposed.	1	
	*Record vegetation as either seeded or native, not for both.	Total	

7-16	Downward
17-26	Static (not apparent)
27-36	Upward

General Remarks:

Source: Draft BLM New Mexico Rangeland Studies
Handbook Supplemental Studies
Manual 4440

APPENDIX B-6

METHODOLOGY

Determination of the Estimated Acre Changes for Each Ecological Condition and Forage Value Class

Estimated acre changes were determined for the Proposed Action and all the various alternatives based on the different intensities of grazing use and the chemical or mechanical treatments proposed. This determination was made on vegetative subtypes on each different range site for the different ecological condition classes which contained data from the field inventory (Appendix B-8).

Changes which were projected to occur in the acres in each ecological condition and forage value class were based on the potential which exists for each site write-up area and the projected change in production and percent of the total composition comprised of desirable and intermediate forage species for the Proposed Action and the various alternatives. On some areas the existing vegetation and low potential would preclude any improvement.

Based on the point system of 0-25 being poor, 26-50 fair, 51-75 good, and 76-100 excellent for the four ecological condition classes, the projected changes for the Proposed Action and the various alternatives were determined as follows:

Proposed Action - No improvement on areas with a 0-10 rating. Improvement from poor to fair with a 16-25 rating and fair to good with a 41-50 rating. In addition, those areas receiving chemical treatments were raised one condition class based on the projected decrease in brush type vegetation and increase in grass species.

No Action Alternative - Decline from fair to poor on areas with a 26-30 rating and good to fair with a 51-55 rating.

Maximization of Livestock Forage Production Alternative -Same as the Proposed Action. In addition, those areas receiving either chemical or mechanical treatments were raised one condition class based on the projected decrease in brush type vegetation and increase in grass species.

Enhancement of Other Resource Values Alternative - A midpoint between the Proposed Action and the Elimination of Livestock Grazing Alternative was used.

Elimination of Livestock Grazing Alternative - Improvement from poor to fair with a 11-25 rating and fair to good with a 36-50 rating.

APPENDIX B-6 (concluded)

The projected changes in the forage value classes were based on a ratio of acres in poor ecological condition to acres in poor forage value, acres in fair ecological condition to acres in fair forage value, and acres in good ecological condition to acres in good forage value which exists at the present time and using the same ratios for the projected changes under the Proposed Action and various alternatives. All changes whether under the Proposed Action or any of the alternatives are the projected changes which would occur by the year 2010.

MAJOR PLANT SPECIES IDENTIFIED IN HIDALGO, LUNA, GRANT, AND PART OF COCHISE COUNTIES a/

PLANT PERSISTENCE b/	SCIENTIFIC NAME	COMMON NAME
	GRASSES	
P	*Andropogon scoparius*	Little bluestem
P	*Aristida* spp.	Threeawn
P	*arizonica*	Arizona threeawn
P	*divaricata*	Poverty threeawn
P	*Bothriochloa barbinodis*	Cane bluestem
P	*saccharoides*	Silver bluestem
A	*Bouteloua barbata*	Six weeks grama
P	*curtipendula*	Sideoats grama
P	*eriopoda*	Black grama
P	*gracilis*	Blue grama
P	*hirsuta*	Hairy grama
P	*radicosa*	Purple grama
P	*rothrockii*	Rothrock grama
A	*Chloris virgata*	Feather fingergrass
P	*Cynodon dactylon*	Bermuda grass
P	*Digitaria californica*	Arizona cottontop
P	*Enneapogon desvauxii*	Spike pappusgrass
P	*Eragrostis* spp.	Lovegrass
P	*Erioneuron pulchellum*	Fluffgrass
P	*Heteropogon contortus*	Tanglehead
P	*Hilaria belangeri*	Curly mesquite
P	*mutica*	Tobosa
P	*Leptochloa dubia*	Green sprangletop
P	*Lycurus phleoides*	Wolftail
P	*Muhlenbergia arenacea*	Ear muhly
P	*arenicola*	Sand muhly
P	*emersleyi*	Bullgrass
P	*porteri*	Bush muhly
P	*Panicum hallii*	Hall's panic grass
P	*obtusum*	Vine-mesquite
P	*virgatum*	Switchgrass
P	*Scleropogon brevifolius*	Burro grass
P	*Setaria* spp.	Bristlegrass
P	*macrostachya*	Plains bristlegrass
P	*Sitanion hystrix*	Bottlebrush squirreltail
P	*Sporobolus* spp.	Dropseed
P	*airoides*	Alkali sacaton
P	*contractus*	Spike dropseed
P	*cryptandrus*	Sand dropseed
P	*flexuosus*	Mesa dropseed
P	*giganteus*	Giant dropseed
P	*wrightii*	Sacaton

PLANT PERSISTENCE[b]	SCIENTIFIC NAME	COMMON NAME
P	*Stipa* spp.	Needlegrass
P	*Tridens muticus*	Slim tridens
A	*Annual grass*	Annual grasses
P	*Perennial grass*	Perennial grasses
	GRASSLIKES	
P	*Carex* spp.	Sedge
	FORBS	
A/P	*Baileya multiradiata*	Desert marigold
P	*Croton pottsii*	Leather-weed
A	*Erodium cicutarium*	Filaree
A	*Eriogonum* spp.	Wild buckwheat
P	*Perezia nana*	Desert holly
A	*Plantago* spp.	Plantain
A	*Salsola kali*	Tumbleweed
P	*Solanum elaeagnifolium*	Silver nightshade
P	*Sphaeralcea* spp.	Globemallow
A	*Annual forb*	Annual forbs
P	*Perennial forb*	Perennial forbs
	SHRUBS, HALF SHRUBS, TREES AND CACTI	
S	*Acacia constricta*	Whitethorn acacia
S	*greggii*	Catclaw acacia
S	*Agave* spp.	Century plant
S	*Aloysia wrightii*	Wright spicebush
S	*Artemisia filifolia*	Sand sagebrush
HS	*ludoviciana*	Sagewort
S	*Atriplex* spp.	Saltbush
S	*canescens*	Fourwing saltbush
S	*obovata*	Obovate-leaf saltbush
S	*Baccharis* spp.	Baccharis
S	*glutinosa*	Seepwillow
S	*Brickellia californica*	California brickelbush
S	*Calliandra eriophylla*	False mesquite
T	*Celtis reticulata*	Net-leaf hackberry
S	*Cercocarpus montanus*	Mountain mahogany
T	*Chilopsis linearis*	Desert willow
HS	*Coldenia canescens*	Spreading coldenia
HS	*Croton* spp.	Croton
S	*Dalea formosa*	Feather peabush
S	*Dasylirion wheeleri*	Wheeler sotol
HS	*Dyssodia acerosa*	Prickleleaf dogweed
S	*Ephedra trifurca*	Mexican tea
S	*Ericameria laricifolia*	Turpentine bush
S	*Eriogonum wrightii*	Wright buckwheat
HS	*Eurotia lanata*	Winterfat
S	*Fallugia paradox*	Apacheplume

APPENDIX B-7 (concluded)

PLANT PERSISTENCE[b/]	SCIENTIFIC NAME	COMMON NAME
S	Flourensia cernua	Tarbush
S	Fouquieria splendens	Ocotillo
S	Garrya wrightii	Wright silktassel
HS	Gutierrezia sarothrae	Broom snakeweed
S	Haplopappus spp.	Goldenweed
S	Hibiscus denudatus	Paleface rose-mallow
S	Hymenoclea monogyra	Burrobush
T	Juglans spp.	Walnut
T	Juniperus monosperma	One-seeded juniper
S	Koeberlinia spinosa	Crown-of-thorns
S	Krameria parvifolia	Range ratany
S	Larrea divaricata	Creosote
S	Lycium pallidum	Pale wolfberry
HS	Menodora scabra	Bull cods
S	Mimosa biuncifera	Catclaw mimosa
S	Nolina spp.	Beargrass
C	Opuntia spp.	Pricklypear & cholla
S	Parthenium incanum	Mariola
T	Pinus edulis	Colorado pinyon pine
T	Plantanus wrightii	Arizona sycamore
S	Prosopis glandulosa	Honey mesquite
S	Quercus spp.	Oak
S	Rhus aromatica	Skunkbrush
S	microphylla	Littleleaf sumac
T	Salix spp.	Willow
HS	Senecio longilobus	Threadleaf groundsel
S	Yucca baccata	Banana yucca
T	elata	Soaptree yucca
HS	Zinnia grandiflora	Rocky Mountain zinnia
HS	pumila	White-flowered zinnia
S	Ziziphus obtusifolia	Graythorn

Source: BLM Las Cruces District Inventory Data, 1982

Notes: a/ A complete list of plant species found during the 1982 Range Inventory is available for review in the Las Cruces District Office. For major plant species identified in Dona Ana County, see Southern Rio Grande EIS, 1981.

b/ A - Annual
P - Perennial
C - Cacti
HS - Half shrub
S - Shrub
T - Tree

APPENDIX B-8

AVERAGE AIR DRY PRODUCTION AND PLANT COMPOSITION BY RANGE SITE

Vegetation Type		Ecological Condition Class	Forage Value Class	Apparent Trend	Pounds Vegetative Cover (per acre)	Percent Vegetative Cover	Percent Litter Cover	Percent Bare Ground	Percent Composition by Weight[a]						
									Grasses			Shrubs			Forbs
									D	I	L	D	I	L	
SOUTHERN DESERT MAJOR LAND RESOURCE AREA (MLRA) 42-SD2															
Gravelly Range Site - D42X010NTX															
	[b]														
Mid grass	2	Fair	Poor	Static	241	16	16	8	3	1	5		4	86	2
	6	Poor	Fair	Static	276	24	27	13	14	25	22			36	3
Creosote	2	Good	Fair	Upward	199	9	21	17	10	15	12		2	57	6
	29	Fair	Poor	Static	149	9	15	28	4	1	10		2	74	9
	10	Poor	Poor	Static	196	8	21	33	1	14	2			80	1
Tarbush	5	Fair	Fair	Static	103	7	13	36	12	8	5			71	4
	5	Poor	Poor	Static	144	13	19	32	5	15	10			58	11
Mesquite	1	Fair	Poor	Static	93	12	24	18			34			51	15
	3	Poor	Poor	Static	164	13	21	45	1		5		1	75	19
Mixed desert shrub	5	Fair	Fair	Static	206	10	16	30	8	9	8			62	12
	5	Poor	Fair	Static	169	24	18	20	11	15	23		1	38	13
Mariola	2	Fair	Poor	Static	188	14	15	13			12		1	78	9
Snakeweed	3	Fair	Fair	Static	74	33	21	9	21	7	16		4	38	14
	5	Poor	Fair	Static	170	12	23	32	24	8	22	4		25	17
Weighted Average[c]					168										
Deep Sand Range Site D42X011NTX															
Tall grass	1	Poor	Fair	Static	286	8	31	58	38		2			30	30
Creosote	1	Poor	Poor	Static	99	16	15	41						99	1
Mesquite	8	Poor	Poor	Static	242	6	21	63				3		96	
Mixed desert shrub	1	Poor	Poor	Static	267	9	28	54	2				35	60	3
Yucca	1	Poor	Poor	Static	87	13	20	35			33			11	55
Weighted Average[c]					229										
Sandy Range Site D42X012NTX															
Mid grass	1	Fair	Good	Static	281	9	15	69	41		3				56
Creosote	8	Poor	Poor	Downward	124	8	26	57	4	1	1			91	3
Tarbush	1	Poor	Poor	Downward	65	2	17	75			3			64	33
Mesquite	10	Poor	Fair	Static	470	10	21	53	5	2		8	3	76	6
Other saltbushes	1	Poor	Good	Upward	677	14	43	42	48		7			13	30
Mixed desert shrub	1	Fair	Fair	Static	108	13	21	55	13		2		9	72	4
	5	Poor	Fair	Static	161	14	28	42	2	1	8	16	1	60	11
Yucca	2	Fair	Fair	Static	318	18	26	45	11	42	24	16		4	2
	1	Poor	Poor	Static	47	6	20	23			3			98	
Whitethorn-catclaw acacia	2	Poor	Poor	Static	232	8	22	37	5		4			90	1
Snakeweed	6	Fair	Fair	Static	428	24	25	43	26	4	18		4	36	13
	10	Poor	Fair	Static	288	11	23	57		3	16	9	3	51	18
Mormon tea	2	Fair	Poor	Static	76	15	20	55	3	1	20		8	26	43
Other shrubs	2	Fair	Fair	Static	118	14	37	24	6	8	10	1		70	5
	1	Poor	Fair	Static	469	13	37	12	10	1	22	9	7	48	2
Weighted Average[c]					269										
Loamy Range Site D42X014NTX															
Filaree	1	Poor	Poor	Static	120	20	26	53			58				41
Short grass	2	Fair	Good	Static	259	16	30	29	32	16	12				40
	1	Poor	Fair	Static	107	9	14	74	24						75

Vegetation Type		Ecological Condition Class	Forage Value Class	Apparent Trend	Pounds Vegetative Cover (per acre)	Percent Vegetative Cover	Percent Litter Cover	Percent Bare Ground	Percent Composition by Weight[a/]						
									Grasses			Shrubs			Forbs
									D	I	L	D	I	L	
SOUTHERN DESERT MLRA 42-SD2 (continued)															
Loamy Range Site D42X014NTX (continued)															
	b/														
Mid grass	5	Fair	Fair	Static	395	21	21	40	14	12	30			28	16
	5	Poor	Fair	Static	363	19	15	20	8	11	18	1		45	16
Creosote	2	Fair	Fair	Downward	97	8	12	15	10	18	4			66	1
	5	Poor	Poor	Static	164	12	25	44	2	7	10			65	16
Tarbush	5	Fair	Fair	Static	223	17	18	47	9	22	19			39	10
	5	Poor	Fair	Static	213	7	17	52	13	1	7			70	8
Mesquite	2	Fair	Fair	Static	230	17	28	33	22	3	8		2	26	38
	4	Poor	Poor	Static	157	18	24	51	7	4	38		2	31	18
Mixed desert shrub	2	Fair	Fair	Static	156	13	20	44	11	8	15		6	49	12
	3	Poor	Poor	Static	140	11	5	46	3	1	7		3	52	33
Yucca	1	Fair	Poor	Static	98	17	40	37		2	27		3		67
	2	Poor	Poor	Static	129	19	24	52	4		15	6	1	27	48
Snakeweed	5	Fair	Fair	Static	249	11	28	54	13	25	27			13	22
	10	Poor	Poor	Static	238	16	21	45	4	8	24			44	22
Sacahuista	3	Fair	Good	Static	539	20	24	29	64		20	8		7	1
	3	Poor	Fair	Static	317	36	16	28	22	5	16	1	3	49	5
Other shrubs	1	Fair	Poor	Static	240	29	39	31		25	48			24	3
	1	Poor	Poor	Downward	160	0	21	44			12				87
Weighted Average[c/]					243										
Draw Range Site D42X016NTX															
Mid grass	1	Excellent	Fair	Static	331	40	17	43	13	82					5
	20	Good	Fair	Static	564	28	26	44	2	85	4			4	4
	10	Fair	Fair	Static	472	29	20	40	6	41	19			14	21
	2	Poor	Good	Static	1,186	18	48	30	48	10	4				38
Tall grass	1	Fair	Fair	Static	967	11	35	54	3	89	5			3	
Creosote	1	Good	Fair	Upward	482	18	29	53	3	84	2			8	3
	2	Poor	Poor	Static	186	5	24	69	4	1	3	1		84	7
Mesquite	1	Good	Fair	Static	432	9	28	62	7	44				17	32
	4	Poor	Poor	Static	412	14	33	38	6	3	6			62	22
Mixed desert shrub	1	Poor	Fair	Downward	64	9	20	32	19		13			44	24
Snakeweed	1	Good	Fair	Static	412	21	47	29		100					
	1	Fair	Poor	Downward	340	21	31	46		18	50			9	24
Other shrubs	2	Poor	Poor	Static	177	9	37	36	1		3			95	2
Desert willow	1	Fair	Good	Static	784	17	29	51	50	4	24			10	12
	4	Poor	Fair	Static	688	23	34	37	11	6	20	1		57	6
Weighted Average[c/]					514										
Bottomland Range Site D42X018NTX															
Other annual forbs	1	Poor	Poor	Static	522	12	48	40		15	3			2	79
Mid grass	4	Good	Fair	Upward	1,445	32	44	23	6	86	3			1	4
	5	Fair	Fair	Static	3,442	23	46	26	5	70	11			6	7
	6	Poor	Fair	Static	956	33	42	23	13	68	2				18
Tall grass	1	Good	Fair	Upward	1,518	56	37	7	3	97					
	2	Fair	Fair	Static	596	21	47	29		94	2				4
	1	Poor	Poor	Static	290	5	15	16					10	90	
Mesquite	1	Good	Fair	Static	102	5	19	76		97	1			1	
	1	Poor	Fair	Static	284	25	34	41		15	2	7	1	74	
Mixed desert shrub	3	Good	Fair	Upward	1,460	23	31	44		73	1	4		18	4
	4	Poor	Good	Upward	221	12	35	47	4	42		22		24	8

Vegetation Type		Ecological Condition Class	Forage Value Class	Apparent Trend	Pounds Vegetative Cover (per acre)	Percent Vegetative Cover	Percent Litter Cover	Percent Bare Ground	Percent Composition by Weight[a] Grasses			Shrubs			Forbs
									D	I	L	D	I	L	
SOUTHERN DESERT MLRA 42-SD2 (continued)															
Bottomland Range Site D42X018NTX (continued)															
	b/														
Mormon tea	1	Poor	Poor	Static	140	11	39	33			14			43	43
Other shrubs	1	Fair	Fair	Downward	30	13	33	54		91				9	
Cottonwood	1	Poor	Poor	Static	1,636	19	28	44		1	1	1		96	1
Other broadleaf trees	3	Poor	Poor	Upward	725	8	48	37	4	2	7			79	9
Weighted Average[c]					1,168										
Limy Range Site D42X019NTX															
Mid grass	2	Poor	Poor	Upward	1,322	22	31	40	3	58	30			2	6
Creosote	4	Poor	Poor	Static	199	9	15	65	4	2	14			80	1
Tarbush	3	Poor	Poor	Static	200	15	20	50	1	21	13			63	2
Mesquite	2	Poor	Poor	Static	126	8	26	61	4	4	4			88	2
Snakeweed	2	Poor	Poor	Static	84	8	25	46	6		17			76	1
Weighted Average[c]					343										
Limestone Hills Range Site D42X021NTX															
Mid grass	1	Fair	Good	Upward	141	53	17	1	80		9			8	2
Creosote	1	Fair	Fair	Static	367	20	9	14	14	51	19			13	3
Mixed desert shrub	1	Fair	Good	Static	155	7	10	1	48	2	7			36	8
	4	Poor	Fair	Static	225	16	16	8	8	6	9		2	72	4
Ocotillo	1	Poor	Fair	Static	233	24	5	1	11	16	5			62	6
Weighted Average[c]					224										
Clayey Range Site D42X023NTX															
Mid grass	6	Good	Fair	Static	362	13	26	15		67	17	2	1	4	8
	9	Fair	Fair	Static	612	19	29	42		67	10		1	10	13
	5	Poor	Fair	Static	354	22	34	36	15	20	17		4	27	16
Creosote	3	Poor	Poor	Static	104	12	16	60	3	10	13		1	61	12
Tarbush	5	Fair	Poor	Static	397	20	22	39	3	57	2			34	5
	5	Poor	Poor	Static	102	15	21	56	4		17			74	5
Mesquite	1	Good	Poor	Static	310	20	21	43		43	8			23	27
	2	Poor	Poor	Static	233	24	13	61	10	1	38			26	26
Mixed desert shrub	1	Good	Fair	Static	317	9	24	67		63	16		6		15
	2	Poor	Poor	Static	82	6	14	69	2	1	4			73	20
Snakeweed	1	Good	Fair	Static	274	22	15	30	17	55	12			12	4
	3	Fair	Fair	Static	262	15	22	29	11	34	15	1	1	24	16
	3	Poor	Poor	Downward	178	6	19	56			10		3	15	74
Weighted Average[c]					323										
Gravelly Sand Range Site D42X024NTX															
Mixed desert shrub	1	Poor	Poor	Static	646	7	34	27	1		8		5	79	7
Mixed mountain shrub	1	Poor	Poor	Downward	640	2	27	33						90	8
Other shrubs	5	Fair	Fair	Static	800	12	38	29	22	5	10	1	19	33	9
	10	Poor	Poor	Static	581	9	35	28	5	3	5		9	67	11
Other broadleaf trees	1	Fair	Fair	Static	434	7	22	34	16	10	2		27	40	6
	7	Poor	Fair	Static	1,089	14	39	22	11	11	4	2	4	65	4
Weighted Average[c]					768										

Vegetation Type		Ecological Condition Class	Forage Value Class	Apparent Trend	Pounds Vegetative Cover (per acre)	Percent Vegetative Cover	Percent Litter Cover	Percent Bare Ground	Percent Composition by Weight[a] Grasses D			Shrubs D			Forbs
									D	I	L	D	I	L	
SOUTHERN DESERT MLRA 42-SD2 (continued)															
Igneous Hills and Mountains Range Site D42X027NTX															
	[b]														
Short grass	2	Poor	Fair	Static	226	8	15	26	10		13		26	34	17
Mid grass	6	Good	Good	Upward	436	26	18	5	56	15	7	1	3	11	6
	15	Fair	Good	Static	542	21	14	9	47	7	9	1	1	24	11
	9	Poor	Fair	Static	254	19	20	6	13	26	3	1	8	37	12
Creosote	5	Fair	Fair	Static	328	16	16	6	28	7	7	1		46	11
	7	Poor	Poor	Static	287	18	16	13	4	12	5		3	64	11
Mesquite	4	Fair	Fair	Static	200	17	16	7	29	8	8			37	20
	3	Poor	Fair	Static	203	9	36	25	14	6	6	6	4	60	4
Mixed desert shrub	6	Fair	Good	Static	466	22	21	3	22	21	6		2	38	10
	6	Poor	Fair	Static	652	11	14	8	12	12	6	1	2	58	9
Oakbrush	1	Fair	Fair	Upward	293	44	21	11	21	9	6			63	2
	4	Poor	Fair	Static	656	11	43	12	17		5	1		71	4
Mixed mountain shrub	5	Fair	Good	Static	280	19	25	4	32	10	5	6		35	12
	5	Poor	Fair	Upward	608	19	24	11	23	7	5	6		51	7
Catclaw acacia	1	Poor	Poor	Static	210	13	26	17	4		18			59	19
Sotol	1	Fair	Fair	Static	113	10	28	7	31		6			61	
Mariola	1	Poor	Poor	Static	728	8	15	8	6	2	5		2	79	6
Snakeweed	1	Good	Good	Static	286	22	15	8	53	14			6	5	22
	6	Fair	Fair	Static	277	23	18	3	25	11	10	2		40	11
	5	Poor	Poor	Static	127	9	13	17	4	15	2		1	47	32
Ocotillo	1	Poor	Good	Static	59	24	23	1	56		3		11	11	20
Other shrubs	1	Poor	Fair	Static	238	13	31	20	15		20	3		60	3
Other broadleaf trees	1	Fair	Good	Static	3,580	11	30	36	75		3		13	7	1
	1	Poor	Poor	Upward	110	27	43	4	7			12		77	6
Pinyon-juniper (Pinyon, Juniper)	1	Fair	Good	Static	209	7	19	10	24			12	8	55	1
	5	Poor	Fair	Static	246	19	28	11	21	7	7	4	5	50	5
Weighted Average[c]					481										
Salty Bottomland Range Site D42X033N															
Mid grass	1	Good	Fair	Static	161	19	21	60		78	12				9
	1	Poor	Fair	Static	119	3	20	77		83					17
Tall grass	1	Fair	Fair	Static	767	50	27	23		72	26				2
Other saltbushes	1	Poor	Fair	Static	223	9	14	77			12	15	18	40	16
Mixed desert shrub	1	Good	Fair	Static	3,262	23	31	46		63		19		18	
Weighted Average[c]					906										
Gravelly Loam Range Site D42X035NTX															
Mid grass	4	Fair	Good	Static	327	18	18	16	24	26	23			21	7
	4	Poor	Fair	Static	262	14	18	21	4	35	6	1	1	26	25
Creosote	4	Poor	Poor	Static	81	8	16	59	4	5	8		1	73	10
Tarbush	1	Fair	Fair	Static	255	10	9	10	14	5	12		1	62	5
	1	Poor	Poor	Static	133	2	19	37	3		6			90	
Mesquite	2	Fair	Good	Static	1,204	17	9	15	41	18	7		1	22	10
	6	Poor	Fair	Downward	145	11	28	26	4	13	4	2	2	69	6
Mixed desert shrub	5	Fair	Good	Static	512	12	19	24	27	9	7	1	5	43	9
	6	Poor	Fair	Static	346	11	20	29	10	3	20	4	1	52	10

Vegetation Type		Ecological Condition Class	Forage Value Class	Apparent Trend	Pounds Vegetative Cover (per acre)	Percent Vegetative Cover	Percent Litter Cover	Percent Bare Ground	Percent Composition by Weight[a]						
									Grasses			Shrubs			Forbs
									D	I	L	D	I	L	
SOUTHERN DESERT MLRA 42-SD2 (continued)															
Gravelly Loam Range Site D42X035NTX (continued)															
	[b]														
Cacti	1	Poor	Poor	Static	346	23	17	17			33			56	12
Snakeweed	4	Fair	Good	Static	355	16	20	25	37	4	11		1	26	22
	6	Poor	Fair	Static	253	16	23	30	5	10	18		4	42	22
Weighted Average[c]					324										
Salt Flats Range Site D42X036N															
Mid grass	2	Good	Fair	Static	317	27	18	58		70	1			20	8
	3	Fair	Fair	Static	71	14	13	59		62	6		1	20	11
	4	Poor	Poor	Static	290	18	28	47	6	34	22		18	1	20
Tall grass	1	Good	Fair	Downward	226	7	21	72		55		5		14	27
	3	Fair	Poor	Static	274	7	28	65		46	17			10	28
	1	Poor	Good	Static	21	11	14	75		8		49	13		29
Tarbush	2	Poor	Poor	Static	140	22	14	57	2	26	6			66	1
Mesquite	3	Fair	Fair	Static	319	17	41	41	3	42	3	9	11	24	8
	5	Poor	Fair	Downward	100	17	19	47	1		7	11	17	55	9
Fourwing saltbush	3	Fair	Fair	Static	290	7	27	65	6	41	2	13	5	32	2
	1	Poor	Fair	Static	52	0	28	13				14	49	38	
Other saltbushes	1	Good	Fair	Static	263	8	42	49		46		19			35
	1	Fair	Poor	Static	40	13	12	68		8	28		23	24	18
	4	Poor	Fair	Downward	180	4	21	72					86	2	12
Mixed desert shrub	1	Good	Good	Static	259	11	25	63	2	62		24		11	1
	3	Fair	Fair	Static	408	17	33	45	6	28	19	2	9	25	11
	3	Poor	Poor	Downward	100	11	17	65		4	9	5		50	32
Snakeweed	2	Poor	Poor	Static	146	17	16	58	2	26	4			28	40
Other shrubs	1	Fair	Poor	Downward	36	14	10	76		36					64
Weighted Average[c]					203										
Malpais Range Site D42X037N															
Mid grass	1	Fair	Fair	Static	677	28	26	12	13	72	3			4	7
	4	Poor	Fair	Static	286	9	18	18	6	40	5			41	9
Creosote	4	Poor	Fair	Static	205	7	14	16	6	22	2		2	59	8
Mesquite	1	Poor	Poor	Static	150	12	10	47	3	17	4			72	3
Mixed mountain shrub	1	Poor	Fair	Static	76	9	17	28	9	38	4			42	7
Weighted Average[c]					260										
WESTERN PLATEAU MLRA 36-WP3															
Gravelly Range Site D36X102N															
Other shrubs	1	Poor	Fair	Static	202	7	41	18	15		6	1		80	
Weighted Average[c]					202										
Hills Range Site D36X103N															
Mixed desert shrub	1	Poor	Poor	Static	275	6	27	8	11		21			43	24
Oakbrush-Mixed mountain shrub	5	Fair	Good	Upward	611	14	24	14	47	10	5	2	4	30	1
	2	Poor	Fair	Static	262	10	17	14	22	16	11			44	8
Pinyon-juniper and Juniper	2	Fair	Good	Static	566	13	17	10	59		5	4		28	4
	7	Poor	Fair	Static	639	12	23	8	13	4	3			78	2
Weighted Average[c]					540										

APPENDIX B-8 (concluded)

Vegetation Type		Ecological Condition Class	Forage Value Class	Apparent Trend	Pounds Vegetative Cover (per acre)	Percent Vegetative Cover	Percent Litter Cover	Percent Bare Ground	Percent Composition by Weight[a/]						
									Grasses			Shrubs			Forbs
									D	I	L	D	I	L	
WESTERN PLATEAU MLRA 36-WP3 (continued)															
Loamy Range Site D36X104N															
	b/														
Mid grass	3	Fair	Good	Static	491	15	20	23	35	21	18			20	6
Creosote	1	Poor	Poor	Static	265	21	28	5	1	10	11			78	1
Weighted Average[c/]					434										
Breaks Range Site D36X105N															
Mid grass	4	Fair	Good	Static	499	23	20	15	40	24	6			22	8
Creosote	5	Poor	Fair	Static	244	16	23	9	16	7	10		1	61	4
Mesquite	2	Poor	Poor	Static	157	7	48	16	1					98	1
Mixed desert shrub	1	Good	Good	Static	244	14	11	5	52	10	10			23	6
	2	Fair	Good	Static	206	20	32	6	39	12	8			36	5
	4	Poor	Fair	Static	208	18	16	13	23	8	14			52	3
Snakeweed	1	Fair	Good	Static	209	17	16	5	45		20			30	5
	1	Poor	Fair	Static	158	12	9	37	19	8	3			71	
Juniper	1	Fair	Good	Static	334	18	31	3	61		3			36	
	1	Poor	Good	Static	529	28	19	3	63		5			31	2
Weighted Average[c/]					284										
Bottomland Range Site D36X106N															
Other annual forbs	1	Poor	Poor	Static	100	2	80	18						60	40
Other shrubs	1	Poor	Poor	Static	1,157	7	30	26	1	2	1	2		89	3
Other broadleaf trees	3	Poor	Poor	Static	2,845	9	32	32	5	6	1			85	3
Weighted Average[c/]					1,958										
Malpais Range Site D36X109N															
Mid grass	1	Fair	Good	Static	725	13	24	22	23	35	6			31	5
Weighted Average[c/]					725										

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Notes: a/D = Desirable, I = Intermediate, L = Least desirable plant species. Line totals do not always equal 100 due to rounding to whole numbers.

b/Indicates the number of transects included.

c/The weighted average is derived from the sum of all the pounds of production of all the vegetation types within a range site divided by the total number of transects within that range site.

APPENDIX B-9

PUBLIC LAND ACRES AND PERCENT BY VEGETATIVE SUBTYPE AND RANGE SITE
MLRA 42 SOUTHERN DESERT SO-2

	Range Site																
Vegetative Subtype	D42X010NTX Gravelly(%)	D42X011NTX Deep Sand(%)	D42X012NTX Sandy(%)	D42X014NTX Loamy(%)	D42X015NTX Draw(%)	D42X018NTX Bottomland(%)	D42X019NTX Limy(%)	D42X021NTX Limestone Hills(%)	D42X023NTX Clayey(%)	D42X024NTX Gravelly Sand(%)	D42X027NTX Igneous Hills & Mountains(%)	D42X033N Salty Bottomland(%)	D42X035NTX Gravelly Loam(%)	D42X036N Salt Flats(%)	D42X037N Malpais(%)	Vegetative Subtype Subtotal	Percent[a]
Filaree				711(1)												711	0.05
Other annual forbs						22										22	0
Short grass				175							38					213	0.01
Mid grass	12,771(2)		175	45,507(32)	50,571(91)	5,272(57)	260(5)	271(3)	54,689(69)		189,456(49)	520(39)	15,945(33)	2,070(3)	8,191(44)	385,698	25.53
Tall grass		157(1)			73	333(4)						138(10)		11,805(19)		12,506	0.83
Creosote	445,338(83)	866(8)	5,894(4)	8,898(6)	969(2)		2,461(47)	357(4)	820(1)		22,743(6)		797(2)		6,328(34)	495,971	32.83
Tarbush	38,029(7)		276	13,554(9)			1,217(23)		11,537(15)				449(1)	1,192(2)		66,254	4.39
Broom dalea		534(5)														534	0.04
Mesquite	801	8,406(78)	48,028(35)	14,586(10)	1,598(3)	75(1)	246(5)		787(1)		5,700(2)		12,285(26)	10,557(17)	1,293(7)	104,362	6.91
Fourwing saltbush														6,430(11)		6,430	0.43
Other saltbushes			32											7,685(13)		7,717	0.51
Mixed desert shrub	19,156(4)	510(5)	12,111(9)	3,567(3)	233	2,013(22)		4,783(59)	3,242(4)	69(2)	48,916(13)	674(51)	8,593(18)	4,783(8)		108,650	7.19
Oakbrush											3,402(1)					3,402	0.23
Mixed mountain shrub											73,032(19)		115		2,790(15)	75,937	5.03
Cacti													367(1)			367	0.02
Yucca		76(1)	2,953(2)	275												3,304	0.22
Whitethorn or catclaw acacia			445													445	0.03
Mariola	2,162										381					2,543	0.17
Snakeweed	19,747(4)	181(2)	59,620(44)	50,685(35)	282(1)		1,041(20)		8,370(11)		37,471(10)		9,620(20)	4,167(7)		191,184	12.65
Fringed sagebrush									21							21	0
Mormon tea			144	888(1)												1,032	0.07
Ocotillo								2,691(33)			1,278					3,969	0.26
Sacahuista				4,395(3)							2,988(1)					7,383	0.49
Other shrubs			6,583(5)	885(1)	808(2)	105(1)				2,062(58)						10,443	0.69
Desert willow					1,185(2)											1,185	0.08
Cottonwood						434(5)										434	0.03
Other broadleaf trees					127	1,086(12)				1,412(40)	419					3,044	0.20
Ponderosa pine																	
Pinyon-juniper											313					313	0.02
Pinyon											1,226					1,226	0.08
Juniper											2,943(1)					2,943	0.19
Playas														12,499(20)		12,499	0.83
Quarries																	
Other barren																	
MLRA-42 TOTAL	538,504	10,730	136,261	144,126	55,846	9,340	5,225	8,102	79,466	3,543	390,306	1,332	48,171	61,188	18,602	1,510,742	100.01
PERCENT OF MLRA	35.65	.71	9.01	9.54	3.70	.62	.35	.54	5.26	.23	25.84	.09	3.19	4.05	1.23		100.01
PERCENT OF TOTAL	32.91	.66	8.31	8.81	3.41	.57	.32	.50	4.86	.22	23.85	.08	2.94	3.74	1.14		92.32

APPENDIX B-9

PUBLIC LAND ACRES AND PERCENT BY VEGETATIVE SUBTYPE AND RANGE SITE
MLRA 36 WESTERN PLATEAU WP-3

	Range Site								Vegetative		Vegetative	
Vegetative Subtype	D36X101N Shallow(%)	D36X102N Gravelly(%)	D36X103N Hills(%)	D36X104N Loamy(%)	D36X105N Breaks(%)	D36X106N Bottomland(%)	D36X107N Clayey(%)	D36X109N Malpais(%)	Subtype Subtotal	Percent a/	Subtype Total*	Percent a/
Filaree											711	0.04
Other annual forbs			350			133(17)			483	0.38	505	0.03
Short grass											213	0.01
Mid grass	84(100)		25,249(30)	8,635(88)	713(2)		105(100)	1,004(100)	35,790	28.48	421,488	25.76
Tall grass											12,506	0.76
Creosote				536(6)	14,953(53)				15,489	12.33	511,460	31.26
Tarbush											66,254	4.05
Broom dalea											534	0.03
Mesquite				85(1)	61				146	0.12	104,508	6.39
Fourwing saltbush											6,430	0.39
Other saltbushes											7,717	0.47
Mixed desert shrub			860(1)		7,278(26)				8,138	6.48	116,788	7.14
Oakbrush			4,254(5)						4,254	3.39	7,656	0.47
Mixed mountain shrub			26,217(31)		642(2)				26,859	21.37	102,796	6.28
Cacti											367	0.02
Yucca					571(2)				571	0.45	3,875	0.24
Whitethorn or catclaw acacia											445	0.03
Mariola											2,543	0.16
Snakeweed			1,599(2)	67(1)	2,507(9)				4,173	3.32	195,357	11.94
Fringed sagebrush											21	0
Mormon tea											1,032	0.06
Ocotillo											3,969	0.24
Sacahuista			672(1)	471(5)					1,143	0.91	8,526	0.52
Other shrubs		640(100)				286(37)			926	0.74	11,369	0.69
Desert willow											1,185	0.07
Cottonwood											434	0.03
Other broadleaf trees			407(1)			350(46)			757	0.60	3,801	0.23
Ponderosa pine			1,883(2)						1,883	1.50	1,883	0.12
Pinyon-juniper			7,227(9)						7,227	5.75	7,540	0.46
Pinyon											1,226	0.07
Juniper			15,923(19)		1,708(6)				17,631	14.03	20,574	1.26
Playas											12,499	0.76
Quarries			117						117	0.09	117	0.01
Other barren			74						74	0.06	74	0
MLRA-36 TOTAL	84	640	84,832	9,794	28,433	769	105	1,004	125,661	100.00	1,636,403	99.99
PERCENT OF MLRA	.07	.51	67.51	7.79	22.63	.61	.08	.80		100.00		
PERCENT OF TOTAL	.01	.04	5.18	.60	1.74	.05	.01	.06		7.69		100.01

Source: BLM Las Cruces District Inventory Data, 1981-1982.

Notes: *Indicates total of both Southern Desert and Western Plateau MLRAs.

a/Percent totals may not add to 100 percent due to rounding.

APPENDIX B-10

POISON PLANTS IDENTIFIED IN HIDALGO, LUNA, GRANT, AND PART OF COCHISE COUNTIES[a]

Plant Persistence[b]	Scientific Name	Common Name	Livestock Poisoned	Toxic Season
S	Agave lecheguilla	Lecheguilla	cattle, sheep, goats	winter, spring to all year
AF	Amaranthus spp.	Pigweeds	cattle, horses, sheep, goats	all year[c]
PF	Asclepias spp.	Milkweeds	cattle, sheep, goats	spring, summer to all year
AF/PF	Astragalus spp.	Locoweeds	cattle, horses, sheep, goats	spring, summer to all year
S	Baccharis pteronioides	Yerba de Pasmo	cattle, sheep	fall, winter
AF/PF	Baileya multiradiata	Desert baileya	sheep, goats	spring, summer to all year
S	Cercocarpus montanus	Mountain mahogany	cattle, horses, sheep, goats	summer, fall
AF	Chenopodium album	Lambsquarter	cattle, horses, sheep, goats	all year[c]
AF	Datura spp.	Thornapples	cattle, horses, sheep	spring, summer to all year
PF	Delphinium spp.	Larkspurs	cattle	spring, summer
AF	Descurainia pinnata	Tansy mustard	cattle, sheep, goats	winter, spring
AF	Drymaria pachyphylla	Inkweed	cattle, sheep, goats	fall, summer, spring to all year
AF/PF	Euphorbia spp.	Spurges	cattle, sheep	all year
S	Flourensia cernua	Tarbush	cattle, sheep, goats	summer, fall
HS	Gutierrezia spp.	Broom snakeweed	cattle, sheep, goats (causes abortion)	winter, spring
AF/BF/PF	Helenium spp.	Sneezeweeds	cattle, sheep	all year
AF	Helianthus annus	Wild sunflower	cattle, horses, sheep, goats	all year[c]
AF/PF	Hymenoxys spp.	Bitterweeds Pingue	cattle, sheep	winter, spring to all year
T	Juniperus spp.	Junipers	cattle (causes abortion)	spring, fall to all year
AF	Kallstroemia spp.	Caltrops	cattle, sheep, goats	spring, summer
PF	Lupinus spp.	Lupines	sheep	summer
S	Nicotiana glauca	Tree tobacco	cattle, horses, sheep	all year
S	Nolina spp.	Sacahuista Beargrass	cattle, goats	spring
PF	Peganum harmula	African rue	cattle, horses, sheep	all year
S	Phoradendron spp.	Mistletoe	cattle	all year
T	Pinus ponderosa	Ponderosa pine	cattle (causes abortion)	spring, fall to all year
S	Prosopis glandulosa	Mesquite	cattle, goats	beans-spring, summer
PF	Psilostrophe tagetina	Woolly paperflower	cattle, sheep	all year

APPENDIX B-10 (concluded)

POISON PLANTS IDENTIFIED IN HIDALGO, LUNA, GRANT, AND PART OF COCHISE COUNTIES[a/]

Plant Persistence[b/]	Scientific Name	Common Name	Livestock Poisoned	Toxic Season
S	Quercus spp.	Oaks	cattle, sheep, goats	spring to all year
PF	Rumex spp.	Spatterdocks	cattle, sheep, goats	spring, fall
AF	Salsola spp.	Russian thistle	cattle, horses, sheep, goats	all year[c/]
HS/PF	Senecio spp.	Groundsels	cattle, horses, sheep, goats	all year
AF/PF	Solanum spp.	Nightshades	cattle, horses, sheep, goats	all year
S/PF	Sophora spp.	Mescal beans	cattle, sheep goats	all year
PG	Sorghum spp.	Johnson grass	cattle, horses, sheep, goats	fall, second growth
AF	Tribulus terrestris	Goathead	sheep	spring, summer
AF	Viguiera annua	Annual goldeneye	cattle	fall
AF	Xanthium spp.	Cockleburs	cattle, horses, sheep	spring
PF	Zygadenus spp.	Death camas	cattle, horses, sheep	spring, summer

Sources: Kingsbury 1964; Norris and Valentine 1954; Schickedanz 1981.

Notes: a/For major plant species identified in Dona Ana County, see the Southern Rio Grande Grazing EIS, 1981. Many of these plant species are important wildlife foods.

b/AF - Annual Forb
PF - Perennial Forb
BF - Biannual Forb
HS - Half Shrub
S - Shrub
T - Tree
PG - Perennial Grass

c/These plants are only toxic under drought conditions.

APPENDIX B-11

THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES POTENTIALLY OCCURRING ON PUBLIC LAND IN THE LAS CRUCES/LORDSBURG RESOURCE[a]

Plant Persistence[b]	Scientific Name	Common Name (Family)	Status[c]	Occurrences in the Resource Area	Habitat
S	Acacia angustissima var. suffrutescens	None (Fabaceae)	SS	Known to occur in Guadalupe Pass, Guadalupe Mountains.	Mountainous regions. This variety is widespread in Arizona.
S	Acacia millefolia	None (Fabaceae)	SS	Found just north of the Mexican border in Guadalupe Canyon, Guadalupe Mountains.	Plants occur in populations of few individuals.
PF	Agastache verticillata	None (Lamiaceae)	E-I	Collected in the Organ Mountains on the military reservation.	Mountains regions at altitudes over 7,000 feet.
PF	Ageratum corymbosum	None (Asteraceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains, in the extreme southwest corner of the county.	Occurs on south-facing rocky banks.
PF	Aletes filifolius	None (Apiaceae)	SS	Collected or found in the Organ Mountains on the military reservation, private and public lands, and in the Burro, Big Hatchet, and Guadalupe Mountains.	Occurs in rocky canyons and on cliffs between 6,200 and 7,300 feet with pinyon and juniper species; are apparently widespread.
PF	Amsonia arenaria	None (Apocynaceae)	E-II	Found in San Andres Mountains on public land.	Occurs in sandhills.
PF	Arabis angulata	None (Brassicaceae)	E-I	Found in Guadalupe Canyon, Guadalupe Mountains.	Mountainous regions. May be a variant of A. perennans.
*NF	Aspicarpa hirtella	None (Malphigiaceae)	SS	Found in Skull Canyon and Maverick Spring Canyon, Peloncillo Mountains.	Scattered locations. Crevices of open rocky south-facing red rhyolite slopes.
AF	Aster blepharophyllus	None (Asteraceae)	FL/C	Found on Las Playas Springs, Hidalgo County on private land.	Occurs on the margins of playas.
PF	Astragalus cobrensis var. maguirei	None (Fabaceae)	E-II	Found in Guadalupe Pass, Guadalupe Mountains.	Occurs on soft powdery, gray soils.
S	Brachystigma wrightii	Wright foxglove (Schrophuliaceae)	SS	Found in Maverick Spring Canyon, Peloncillo Mountains.	Occurs on mountain sides with pinyon and pine between 5,000 and 7,500 feet.
PF	Brickellia lemmoni	None (Asteraceae)	E-II	Found in Maverick Spring Canyon, Peloncillo Mountains.	Occurs under oaks among grasses.
*	Brickellia simplex	None (Asteraceae)	SS	Found in Maverick Spring Canyon and Skull Canyon, Peloncillo Mountains.	Occurs in grassy canyon bottoms under oaks between 5,576 and 5,600 feet.
AF	Calandrinia ciliata var. menziesii	Red maids (Portulacaceace)	SS	Found on Animas Peak, Animas Mountains on private land.	Occurs on grassy foothills at altitudes of 1,650 feet.
PF	Castilleja organorum	None (Scrophulariaceae)	E-I	Found in Dripping Springs, Organ Mountains on private land.	Occurs on rocky sides of the Organ Mountains at altitudes of 5,700 feet.
AF	Cerastium texanum	None (Caryophyllaceae)	SS	Found just inside New Mexico in Guadalupe Canyon, Guadalupe Mountains.	Occurs on steep northwest-facing slopes.
C	Cereus greggii	Night blooming cereus (Cactaceae)	FL/C	Found in the Alamo Hueco Mountains, Rough & Ready Hills, Las Uvas Mountains, Franklin Mountains, Flourite Ridge, Carrizalillo Hills, Little Hatchet Mountains, Sierra Rica Mountains, Peloncillo Mountains, Organ Mountains, Potrillo Mountains, and Pyramid Mountains.	Populations are widespread with a few individuals in each. Grows on gravelly range sites with bush muhly, Mormon tea, creosote, and range ratany; under or near creosote and mesquite bushes in rocky areas; common at lower elevations; granite soil (rhyolite) and deep light soils. Altitudes 4,000-4,500 feet.

APPENDIX B-11 (continued)

Plant Persistence[b/]	Scientific Name	Common Name (Family)	Status[c/]	Occurrences in the Resource Area	Habitat
FN	Cheilanthes pringlei	Pringle's cheilanthes (Polypodiaceae)	E-II	Found in the Peloncillo and Animas Mountains.	Occurs on steep north-facing rocky shaded slopes under pinyon-juniper; from 3,000-6,250 feet where moisture is trapped.
AF	Cleome multicaulis	None (Capparaceae)	FL/C	Collected in the Mesilla Valley, Dona Ana County and in Grant County.	Occurs on alkaline sinks, old saline lake beds, and cienegas from 3,000 to 7,000 feet.
C	Coryphantha orcuttii var. koenigii	None (Cactaceae)	E-I	Found in Mahoney Park, Florida Mountains on private land.	Occurs on black limestone at altitudes of 5,200 feet.
C	Coryphantha orcuttii var. macraxina	None (Cactaceae)	E-I	Found in the Big Hatchet Mountains.	Occurs solitary to clustered with few individuals at altitudes of 7,000 feet.
C	Coryphantha orcuttii var. orcuttii	None (Cactaceae)	E-II	Collected on Granite Gap, Peloncillo Mountains.	Found on exposed outcrops with sotol, Agave, mesquite, and Acacia.
C	Coryphantha organensis	Organ Mountain coryphantha (Cactaceae)	E-I	Found on the Needles, in Dripping Springs, and Fillmore Canyon, Organ Mountains on private land and the military reservation.	Occurs on west-facing mountain slopes.
C	Coryphantha sneedii var. sneedii	Sneed's pincushion cactus (Cactaceae)	FL/E	Collected in Anthony Gap, Franklin Mountains.	Occurs on limestone hills on south- and west-facing slopes with sotol, creosote, sumac, and Dalea between 4,300-5,400 feet.
AF	Cuphea wrightii	None (Lythraceae)	SS	Found in Skull Canyon, Peloncillo Mountains.	Mountainous regions.
T	Cupressus arizonica	Arizona cypress (Cupressaceae)	SS	Found on Cooke's Peak, Cooke's Range.	Scattered to dense stands straddling ridges and downsides. Mixed with pinyon and alligator juniper. Dominant on ridgecrests at altitudes from 6,200 to 7,400 feet.
PF	Dalea pulchra	None (Fabaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains.	Found on rocky knolls.
PF	Delphinium occidentale var. quercicola	Duncecap larkspur (Ranunculaceae)	E-I	Found in the Pinos Altos Mountains, Gila National Forest.	Growing in dry soils among scrub oak thickets.
PF	Draba mogollonica	Whitlowgrass (Brassicaceae)	SS	Collected on Bear Mountain, Gila National Forest, and Whitehorse Mountain on private land.	Species widespread in southwest New Mexico.
PF	Draba stanleyi	None (Brassicaceae)	E-I	Found on Little Mountain, near Las Cruces (Tortugas Mountain) and Organ Peak, Organ Mountains on the military reservation.	Occurs in mountainous regions; igneous crevices and boulders.
C	Echinocereus lloydii	Lloyd's hedgehog cactus (Cactaceae)	FL/E	Found in the East Potrillo Mountains.	Occurs on arid hills and hillsides. Found near black limestone with creosote, ocotillo, sideoats grama, and Yucca.
AF	Eriogonum densum	None (Polygonaceae)	SS	Collected or found near Bayard and Santa Rita on private land; and on Bear Mountain (near Silver City), Gila National Forest.	Seems to occur around disturbed open rocky areas at altitudes of 5,000 to 6,500 feet. May be extinct.
PF	Eryngium sparganophyllum	None (Apiaceae)	E-II	Found near Playas Lake in the Playas Valley on private land.	Occurs on marshy ground on an area with intermittent springs.
AF	Erysimum desertorum	None (Brassicaceae)	E-I	Collected near Hachita, New Mexico.	Xerophytic members of E. capitatum, E. argillosum complex.

Plant Persistence[b/]	Scientific Name	Common Name (Family)	Status[c/]	Occurrences in the Resource Area	Habitat
AF	Eustoma exaltatum	Prairie gentian (Gentianaceae)	SS	Found in the Rio Grande Valley, north of Las Cruces on private land.	Occurs on alkaline, wet meadows in sod saltgrass at altitudes of 3,500 feet.
S	Eysenhardtia polystachya	Kidneywood (Fabaceae)	SS	Found in Owl Canyon, Peloncillo Mountains on private land.	Occurs in the upper part of the canyon.
AF	Gomphrema sonorae	None (Amaranthaceae)	SS	Found in Skull Canyon, Peloncillo Mountains.	Occurs in soil pockets on west-facing open slopes. First record in New Mexico.
PF	Graptopetalum rusbyi	None (Crassulaceae)	E-II	Found in Apache Box along Apache Creek.	Occurs along the creek in the shade with ferns and mosses on quartzite and boulders and in open places among rocks in canyons from 2,500 to 5,200 feet.
BF	Grindelia arizonica var. dentata	None (Asteraceae)	E-I	Found on Bear Mountain, Gila National Forest near Silver City.	Mountainous regions.
PF	Habenaria sparsiflora var. brevifolia	None (Orchidaceae)	E-II	Found in the Pinos Altos Mountains, Gila National Forest.	Occurs on dry southward slopes in open woods of ponderosa pine.
HS	Halophyton crookii	Cockroach plant (Apocynaceae)	SS	Found near Mount Summerford, Dona Ana Mountains, New Mexico State University (College Ranch).	Occurs on south slopes.
*NF	Hymenoxys olivacea	None (Asteraceae)	E-I	Found in the Pinos Altos Mountains on private land.	Occurs in mountainous regions.
*NF	Ipomoea egregia	None (Convolvulaceae)	E-II	Found on Bear Mountain, Silver City Range, Gila National Forest.	Occurs on pale bedrock outcrops in west-northwest draining canyons, pinyon-juniper zone with sideoats grama, Yucca, black grama, wolfberry, and Wright silktassel at 6,500 feet.
*NF	Ipomopsis macombii	None (Polemoniaceae)	SS	Found in Guadalupe Pass, Guadalupe Mountains.	Mountainous regions.
PF	Jatropha macrorhiza	None (Euphorbiaceae)	SS	Found in Mahoney Park, Florida Mountains.	Found growing near a sandy arroyo in flat open country with sumac, Indian paintbrush, four-wing saltbush, and creosote.
BF	Macheranthera amplifolia	None (Asteraceae)	E-II	Found in Fillmore Canyon, Organ Mountains on the military reservation.	Mountainous regions.
C	Mammillaria heyderi var. bullingtoniana	None (Cactaceae)	SS	Found near Cliff in the Gila River Valley on private land.	Occurs usually on rhyolite in southern mountain areas of New Mexico between 4,500-6,300 feet.
C	Mammillaria heyderi var. macdougalii	None (Cactaceae)	SS	Occurs in the Peloncillo Mountains on private land.	A single plant was seen on a low hill near Section pond.
C	Mammillaria viridiflora	Pincushion cactus (Cactaceae)	E-II	Collected or found in the Burro Mountains and Bear Mountain, Gila National Forest, Deadman Canyon, on private land, and Skeleton Canyon, Peloncillo Mountains, Coronado National Forest.	Found on north-facing granite slopes and on rhyolite tuff at 6,000 feet.
PF	Mecardonia vandellioides	None (Scrophulariaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains, just northeast of the Arizona, New Mexico, and the Mexico border.	Mountainous regions.
*	Metastelma arizonicum	None (Asclepiadaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains.	Occurs on steep southwest-facing slopes.

Plant Persistence[b]	Scientific Name	Common Name (Family)	Status[c]	Occurrences in the Resource Area	Habitat
PF	Milla biflora	Mexican star lily (Liliaceae)	SS	Found in scattered locations, Maverick Springs, Skull and Post Canyons, Peloncillo Mountains.	Found in small numbers on protected north-facing slopes and cliffs.
*NF	Mimulus cordatus	None (Scrophulariaceae)	E-I	Found near Animas Creek, Animas Valley on private land and on Bear Mountain, Silver City Range, Gila National Forest.	Found in moist ground along the creek.
S	Mimosa grahamii	None (Fabaceae)	E-II	Found in Guadalupe Pass, Guadalupe Mountains.	Mountainous regions.
PF	Oenothera organesis	Organ Mountain Evening Primrose (Onagraceae)	FL/C	Found in numerous canyons and on various peaks in the Organ Mountains mostly on the military reservation and public land.	Occurs in wet areas forming dense mats and in steep rocky canyons from 6,000 to 7,000 feet.
C	Opuntia arenaria	Club cholla (Cactaceae)	FL/C	Found near Mesquite, New Mexico, on private land and around the Franklin Mountains.	Grows on dunes and interdune sandy areas in small (5-12 plants) patches with creosote and mesquite.
C	Opuntia wootonii	None (Cactaceae)	E-I	Found in Bar Canyon, Organ Mountains.	Mountainous regions.
PF	Oxalis pilosa	None (Oxalidaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains.	Found under oak species on an arroyo bank.
AF	Pectocarya recurvata	None (Boraginaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains, Coronado National Forest.	Occurs on rocky ground.
C	Pediocactus papyracanthus	Grama grass cactus (Cactaceae)	FL/C	Collected around Pinos Altos near Silver City on private land.	Occurs on sandy soil on open slopes or flats in grassland; often among pinyon and juniper from 5,000 to 7,300 feet.
PF	Penstemon alamosensis	Alamo penstemon (Scrophulariaceae)	FL/C	Collected on Black Mountain, San Andres Mountains on the military reservation.	Grows in crevices and ledges in limestone cliffs and along canyon bottoms.
PF	Penstemon dasphyllus	Thickleaf beardtongue (Scrophulariaceae)	E-II	Found in the Cooke's Range and the Big Hatchet Mountains.	Found scattered on gravelly slopes in desert grasslands and on stony hills.
PF	Penstemon lanceolatus	Scarlet-tube beardtongue (Scrophulariaceae)	E-II	Found in the Sierra de Las Uvas, Florida Mountains, Cooke's Range, Alamo Hueco Mountains, and Pyramid Mountains.	Found associated with creosote, snakeweed, and juniper on rocky soil in draws; on east-facing slopes with ocotillo, Wright silktassel, and Apacheplume; scattered on southwest-facing slopes under mountain mahogany and oak and in open areas with various grasses; also on rocky canyons of pinyon-juniper or in pine woodlands.
PF	Penstemon superbus	None (Scrophulariaceae)	SS	Found northwest of Silver City and in the Peloncillo Mountains on private land and in Guadalupe Canyon, Guadalupe Mountains.	Found in the gravels of canyon bottoms and in talus gravels below some cliffs; also occurred in an open arroyo bottom at 4,770 feet. Plants are commonly grazed.
PF	Perityle cernua	Rock daisy (Asteraceae)	FL/C	Collected in various canyons in the Organ Mountains on the military reservation.	Occurs in crevices and overhangs on northeast-facing vertical monzonite and granite cliff faces at elevations of 5,800 to 7,200 feet. Areas receive no sunlight or less than two hours per day.

APPENDIX B-11 (continued)

Plant Persistence[b]	Scientific Name	Common Name (Family)	Status[c]	Occurrences in the Resource Area	Habitat
PF	Perityle lemmonii	Rock daisy (Asteraceae)	E-II	Found in the Big Hatchet Mountains.	Occurs on limestone cliffs at elevations of 5,300 to 5,600 feet. Is a peripheral species from Mexico, Texas, and Arizona.
PF	Perityle staurophylla var. homoflora	None (Asteraceae)	SS	Collected on Quartzite Mountain in the San Andres Mountains on the military reservation.	Found on east-facing limestone cliffs at 5,800 feet and in the pinyon-juniper zone.
AF	Phacelia intermedia	None (Hydrophyllaceae)	E-II	Found on a mesa near Las Cruces.	Occurs on sandy to gravelly or clay soils of foothills or higher mesas from 3,750 to 5,000 feet.
PF	Phacelia neomexicana	None (Hydrophyllaceae)	E-II	Found near Santa Rita, Pinos Altos Mountains on private land.	Occurs in pine woods. Species is seldom collected.
*NF	Phacelia tenuipes	None (Hydrophyllaceae)	E-I	Found near Carrizalillo Springs, Luna County on private land.	Occurs with Mahonia trifoliata.
PF	Phanerophlebia auriculata	None (Polypodiaceae)	SS	Found near Dripping Springs, Organ Mountains on private land.	Occurs in cool, shady, moist areas on north-facing cliffs. Northernmost location in the United States.
S	Philadelphus argentatus	None (Saxifragaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains.	Occurs on steep northwest-facing talus slopes at the base of cliffs.
S	Philadelphus mearnsii	Mearns' mockorange (Saxifragaceae)	E-II	Found in Wamels Draw, Sierra Rica (Cedar).	One plant found in crevice of bare limestone ridge.
T	Pinus edulis var. fallax	Pinyon pine (Pinaceae)	E-II	Found in Spring Canyon, Florida Mountains.	Scattered along the canyon with Apacheplume and juniper.
PF	Plummera ambigens	None (Asteraceae)	E-II	Found in Maverick Spring Canyon, Peloncillo Mountains on private land.	Occurs on sandy gravels in canyon bottoms.
HS	Porophyllum gracile	None (Asteraceae)	SS	Found in the Apache Hills and Guadalupe Mountains, Hidalgo County.	Found on rocky ridges among ocotillo and agave.
PF	Porophyllum ruderale var. macrocephalum	None (Asteraceae)	SS	Found in Skull Canyon, Peloncillo Mountains and Guadalupe Canyon, Guadalupe Mountains.	Occurred in a small soil pocket on an east-facing open slope.
S	Rosa stellata	Desert rose (Rosaceae)	FL/C	Collected in Fillmore Canyon, Organ Mountains on the military reservation.	Occurs on steep, north-facing, heavily shaded igneous cliffs between 6,000 and 8,000 feet.
S	Rubus exrubicundus	None (Rosaceae)	E-II	Collected in Dripping Springs, Organ Mountains.	Found in the Upper Sonoran Zone on the face of cliffs and in deep rocky canyons.
S	Sageretia wrightii	None (Rhamnaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains.	Mountain canyons from 3,000 to 5,000 feet.
PF	Salvia summa	Mountain sage (Lamiaceae)	E-II	Found on Rattlesnake Ridge, Organ Mountains on the military reservation.	Occurs at the base of limestone outcrops on a ridge at 5,500 feet.
AF	Schistophragma intermedia	None (Scrophulariaceae)	E-II	Found in Maverick Spring Canyon and Skull Canyon, Peloncillo Mountains.	Found in soil pockets on open slopes.
PF	Scrophularia laevis	Smooth figwort (Scrophulariaceae)	E-I	Found and collected on the Organ Needle and Organ Peak, Organ Mountains on public land and the military reservation.	Found on the highest peak in the Organ Mountains and on a moist, shaded slope high on Organ Peak (7,200 feet).

APPENDIX B-11 (continued)

Plant Persistence[b/]	Scientific Name	Common Name (Family)	Status[c/]	Occurrences in the Resource Area	Habitat
PF	Scrophularia macrantha	Red figwort (Scrophulariaceae)	FL/C	Found on Cooke's Peak, Cooke's Range and on private land in Grant County (San Lorenzo).	Found among rock debris in a cliff area facing northeast among pinyon, juniper, Arizona cypress, and ash, in a wet spot. Few plants present. Also found on a rocky ledge near the summit of a mountain in full or partial shade from 6,500 to 7,500 feet.
S	Senecio salignus	None (Asteraceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains.	Mountainous regions from 2,500 to 5,000 feet in rich soils along streams.
AF	Sicyos glaber	None (Cucurbitaceae)	E-I	Collected in various locations on the west side of the Organ Mountains on the military reservation and on public land.	Occurs in rocky soils on open slopes and in canyons on the west face of the Organ Mountains from 5,000 to 6,000 feet.
PF	Silene plankii	Campion; Plank's catchfly (Caryophyllaceae)	E-I	Collected in the Organ Mountains on the military reservation.	Found on vertical east- and west-facing heavily shaded igneous cliffs in canyons and in nitches receiving less than two hours sunlight per day between 5,800 and 8,000 feet.
PF	Silene thurberi	Thurber's catchfly (Caryophyllaceae)	SS	Found in Skull Canyon, Peloncillo Mountains, and Guadalupe Canyon, Guadalupe Mountains.	Scattered locations in small numbers on protected north-facing rocky slopes and cliffs.
*NF	Silene wrightii	Wright's catchfly (Caryophyllaceae)	E-I	Found and collected near Kneeling Nun on private land and in the Cooke's Range.	Occurs in crevices of rocks and on sandstone ledges on north-facing ridges at 7,450 feet.
S	Sophora formosa	None (Fabaceae)	E-II	Found in the Guadalupe Mountains, Coronado National Forest.	Grows on steep, rocky, west-facing slopes with ocotillo, sotol, oaks, creosote, and mesquite.
PF	Sphaeralcea emoryi var. variabilis	None (Malvaceae)	SS	Found in Guadalupe Canyon, Guadalupe Mountains.	Occurs on rocky slopes.
AF	Sphaeralcea procera	None (Malvaceae)	E-I	Collected in Chandler Draw northeast of Deming, New Mexico.	Occurs in sandy arroyos.
AF	Stellaria nitens	None (Caryophyllaceae)	SS	Found on Bear Mountain, Silver City Range, Gila National Forest.	Found in west-northwest draining canyons in the pinyon-juniper zone.
PG	Stipa curvifolia	None (Poaceae)	E-II	Found near Bishops Cap, Organ Mountains on the military reservation, and on Tortugas Mountain.	Found on north- and northeast-facing slopes at 4,500 feet.
PF	Talinum longipes	None (Portulacaceae)	E-I	Collected on Tortugas Mountain, Dona Ana County.	Mountainous regions.
*	Tiquilia gossypina	None (Boraginaceae)	SS	Found on Tortugas Mountain, Dona Ana County.	Mountainous regions.
S	Vauquelinia pauciflora	Mexican rosewood (Rosaceae)	FL/C	Found in the Peloncillo Mountains, Coronado National Forest.	Occurs on limestone with juniper, sumac, Wright silktassel, and fendlerbush from 4,100 to 6,100 feet.

APPENDIX B-11 (concluded)

Sources: Spellenburg, 1978; Spellenburg, 1979; New Mexico Heritage Program, 1982.

Notes: a/To ensure complete coverage of all threatened, endangered, or sensitive plant species, consideration was given to all species on public land or within one mile of public land.

b/Plant Persistence:
* - Information pertaining to plant persistence was not available.
PG - Perennial Grass
AF - Annual Forb
BF - Biannual Forb
PF - Perennial Forb
NF - Native Forb
HS - Half Shrub
S - Shrub
T - Tree
FN - Fern
C - Cactus

c/Status:
FL/E - Federally Listed/Endangered
FL/C - Federally Listed/Candidate (species designated as "candidate species" by the Fish and Wildlife Service)
E-I - Endemic-I - Locality is restricted entirely to the State (New Mexico Heritage Program)
E-II - Endemic-II - Locality is restricted to several states (New Mexico Heritage Program)
SS - State Sensitive (species selected by the New Mexico Heritage Program as a special concern element)

APPENDIX C
SOILS

APPENDIX C-1

SERIES AND CLASSIFICATION OF SOILS IN THE 3-COUNTY AREA

Soil Series	CLASSIFICATION
Abrazo	Fine, mixed, mesic Aridic Argiustoll
Akela	Loamy-skeletal, mixed (calcareous), thermic Lithic Torriorthent
Anthony	Coarse-loamy, mixed, thermic Typic Torrifluvent
Arizo	Sandy-skeletal, mixed, thermic Typic Torriorthent
Berino	Fine-loamy, mixed, thermic Typic Haplargid
Bluepoint	Mixed, thermic Typic Torripsamment
Boysag	Clayey, mixed, mesic Lithic Ustollic Haplargid
Brenda	Fine-loamy over sandy or sandy-skeletal, mixed, thermic Aridic Argiustoll
Bucklebar	Fine-loamy, mixed, thermic Typic Haplargid
Chiricahua	Clayey, mixed, thermic, shallow Ustollic Haplargid
Comoro	Coarse-loamy, mixed, thermic Cumulic Haplustoll
Continental	Fine, mixed, thermic Typic Haplargid
Cottonwood	Loamy, mixed (calcareous), thermic, shallow Ustic Torriorthent
Dogflat	Fine-loamy, mixed, mesic Aridic Argiustoll
Dona Ana	Fine-loamy, mixed, thermic Typic Haplargid
Eba	Clayey-skeletal, mixed, thermic Typic Haplargid
Ellicott	Sandy, mixed, mesic Ustic Torrifluvent
Encierro	Clayey, mixed, mesic Lithic Argiustoll
Forrest	Fine, mixed, thermic Ustollic Haplargid
Frye	Fine, mixed, thermic Typic Durargid
Gila	Coarse-loamy, mixed (calcareous), thermic Typic Torrifluvent
Glendale	Fine-silty, mixed (calcareous), thermic Typic Torrifluvent
Grabe	Coarse-loamy, mixed, thermic Cumulic Haplustoll
Graham	Clayey, montmorillonitic, thermic Lithic Argiustoll
Hap	Fine-loamy, mixed, thermic Typic Haplargid
Harkey	Coarse-silty, mixed (calcareous), thermic Typic Torrifluvent
Hawkeye	Sandy, mixed, thermic Torriorthentic Haplustoll
Hondale	Fine, mixed, thermic Typic Natrargid
Jal	Fine-loamy, carbonatic, thermic Typic Calciorthid
Karro	Fine-loamy, carbonatic, thermic Ustollic Calciorthid
Keno	Fine, mixed, thermic Vertic Camborthid
Ledru	Clayey, mixed, thermic Lithic Argiustoll
Lehmans	Clayey, montmorillonitic, thermic Lithic Haplargid
Lozier	Loamy-skeletal, carbonatic, thermic Lithic Calciorthid
Luxor	Loamy, mixed, thermic Lithic Haplargid
Luzena	Clayey, montmorillonitic, mesic Lithic Argiustoll
Manzano	Fine-loamy, mixed, mesic Cumulic Haplustoll
Maricopa	Coarse-loamy over sandy or sandy-skeletal, mixed (calcareous), thermic Typic Torrifluvent
Mimbres	Fine-silty, mixed, thermic Typic Camborthid
Mohave	Fine-loamy, mixed, thermic Typic Haplargid
Muzzler	Clayey-skeletal, mixed, mesic Lithic Argiustoll
Nickel	Loamy-skeletal, mixed, thermic Typic Calciorthid
Paymaster	Coarse-loamy, mixed, mesic Cumulic Haplustoll
Pima	Fine-silty, mixed, thermic Cumulic Haplustoll

APPENDIX C-1 (concluded)

Pinaleno	Loamy-skeletal, mixed, thermic Typic Haplargid
Pintura	Mixed, thermic Typic Torripsamment
Plack	Loamy, mixed, mesic, shallow Petrocalcic Calciustoll
Santa Fe	Loamy-skeletal, mixed, mesic Lithic Argiustoll
Santana	Loamy, mixed, mesic Lithic Haplustoll
Simona	Loamy, mixed, thermic, shallow Typic Paleorthid
Sonoita	Coarse-loamy, mixed, thermic Typic Haplargid
Stellar	Fine, mixed, thermic Ustollic Haplargid
Terino	Loamy-skeletal, mixed, thermic, shallow Petrocalcic Ustollic Paleargid
Tres Hermanos	Fine-loamy, mixed, thermic Typic Haplargid
Turney	Fine-loamy, mixed, thermic Typic Calciorthid
Ubar	Fine, mixed, thermic Typic Camborthid
Upton	Loamy, carbonatic, thermic, shallow Typic Paleorthid
Vekol	Fine, mixed, thermic Typic Haplargid
Verhalen	Fine, montmorillonitic, thermic Mollic Torrert
Whitlock	Coarse-loamy, mixed, thermic Typic Calciorthid
Yana	Coarse-loamy, mixed, nonacid, thermic Typic Torriorthent
Yturbide	Mixed, thermic Typic Torripsamment

Source: Soil Conservation Service, Soil Surveys Hidalgo County (1973), Luna County (1980), and Grant County (unpublished).

APPENDIX C-2

PSIAC METHODOLOGY FOR CALCULATING SEDIMENT YIELD

The PSIAC method can be used to estimate annual sediment yield of large areas and is flexible enough to objectively analyze areas ranging from less than an acre to greater than 10 square miles in size. The ability of the user to properly rate the nine factors of the method is its strength, as there is flexibility to adjust with the introduction of additional information. Previous studies indicate that PSIAC correlates with measured yields. By definition, the method develops an estimate of a relative range of values whereby one can objectively compare areas, treatments, or expected magnitude of change over areas that range greatly in size. Expressing the values in specific units does not detract from the usefulness of the results, and provides some measure of the physical meaning of the numbers, even if approximate. An alternative methodology such as the Universal Soil Loss Equation was designed for developed areas, and has not been adapted and checked for use in vast areas of natural lands. It requires a sediment transport and channel erosion model to arrive at sediment production. A large number of small study areas would be required to develop estimates; these would be very time consuming for an area as large as the Resource Area.

The following tables are the PSIAC Sediment Yield Factor Rating Form (Form 7310-16) and additional information on rating each of the factors.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SEDIMENT YIELD FACTOR RATING

SURFACE GEOLOGY (a)	SOILS (b)	CLIMATE (c)	RUNOFF (d)	TOPOGRAPHY (e)
(10) a. Marine shales and related mudstones and siltstones	(10) a. Fine textured; easily dispersed; saline-alkaline; high shrink-swell characteristics b. Single grain silts and fine sands	(10) a. Storms of several days' duration with short periods of intense rainfall b. Frequent intense convective storms c. Freeze-thaw occurrence	(10) a. High peak flows per unit area b. Large volume of flow per unit area	(20) a. Steep upland slopes (in excess of 30%) b. High relief; little or no floodplain development
(5) a. Rocks of medium hardness b. Moderately weathered c. Moderately fractured	(5) a. Medium textured soil b. Occasional rock fragments c. Caliche layers	(5) a. Storms of moderate duration and intensity b. Infrequent convective storms	(5) a. Moderate peak flows per unit area b. Moderate volume of flow per unit area	(10) a. Moderate upland slopes (less than 20%) b. Moderate fan or floodplain development
(0) a. Massive, hard formations	(0) a. High percentage of rock fragments b. Aggregated clays c. High in organic matter	(0) a. Humid climate with rainfall of low intensity b. Precipitation in form of snow c. Arid climate, low intensity storms d. Arid climate; rare convective storms	(0) a. Low peak flows per unit area b. Low volume of runoff per unit area c. Rare runoff events	(0) a. Gentle upland slopes (less than 5%) b. Extensive alluvial plains
Factor value				

GROUND COVER (f)	LAND USE (g)	UPLAND EROSION (h)	CHANNEL EROSION AND SEDIMENT TRANSPORT (i)
(10) Ground cover does not exceed 20% a. Vegetation sparse; little or no litter b. No rock in surface soil	(10) a. More than 50% cultivated b. Almost all of area intensively grazed c. All of area recently burned	(25) a. More than 50% of the area characterized by rill and gully or landslide erosion	(25) a. Eroding banks continuously or at frequent intervals with large depths and long flow duration b. Active headcuts and degradation in tributary channels
(0) Cover not exceeding 40% a. Noticeable litter b. If trees present understory not well developed	(0) a. Less than 25% cultivated b. 50% or less recently logged c. Less than 50% intensively grazed d. Ordinary road and other construction	(10) a. About 25% of the area characterized by rill and gully or landslide erosion b. Wind erosion with deposition in stream channels	(10) a. Moderate flow depths, medium flow duration with occasionally eroding banks or bed
(–10) a. Area completely protected by vegetation, rock fragments, litter b. Little opportunity for rainfall to reach erodible material	(–10) a. No cultivation b. No recent logging c. Low intensity grazing	(0) a. No apparent signs of erosion	(0) a. Wide shallow channels with flat gradients and short flow duration b. Channels in massive rock, large boulders, or well vegetated c. Artificially controlled channels
Factor value			

Subtotal (a) – (g)	Subtotal (h) – (i)	TOTAL RATING – – – = – – . – ac.ft./sq. mi./yr.

(Instructions on reverse)

Form 7310–16 (July 1971)

EXAMPLES OF HIGH AND LOW FACTORS OF THE PSIAC METHOD

Factor	Rating Range	Main Characteristics Considered		High Value	Low Value
Surface geology	0 - 10	Rock Type Hardness	Weathering Fracturing	Soft fissile shale	Thick basalt flow
Soils	0 - 10	Texture Aggregation Shrink-swell Organic matter	Rockiness Salinity Caliche	Non-aggregated silty clays	Loamy sand
Climate	0 - 10	Storm frequency, intensity, duration Snow	Freeze-thaw	Frequent intense storms	50% snow precipitation
Runoff	0 - 10	Volume per unit area Peak flow per unit area		August peak flow	April peak flow
Topography	0 - 20	Steepness of slopes Relief Fan and flood plain development		30% slopes	5% slopes
Ground cover	-10 - 10	Vegetation Litter	Rocks	30% total ground cover	70% total ground cover
Land use (grazing)	-10 - 10	Grazing intensity Percentage cultivated		60% utilization	20% utilization
Upland erosion	0 - 25	Rills, gullies, arroyos, landslides Wind deposits in channels		50% gullies, rills, arroyos	No visible flow patterns
Channel erosion and sediment transport	0 - 25	Bank and bed erosion Flow depths Active headcuts Vegetation in channels		Active headcuts and eroding banks	Flat gradients, wide channels

WIND ERODIBILITY GROUPS (WEG)

Wind erodibility groups are made up of soils that have similar properties that affect their resistance to soil blowing if cultivated. The groups are used to predict the susceptibility of soil to blowing and the amount of soil lost as a result of blowing. Soils are grouped (1 through 8) according to the following distinctions:

1 - Sands, coarse sands, fine sands, and very fine sands. These soils are extremely erodible, so vegetation is difficult to establish. They are generally not suitable for crops.

2 - Loamy sands, loamy fine sands, and loamy very fine sands. These soils are highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

3 - Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

4L- Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible, but crops can be grown if intensive measures to control soil blowing are used.

4 - Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible, but crops can be grown if measures to control soil blowing are used.

5 - Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonates. These soils are slightly erodible, but crops can be grown if measures to control soil blowing are used.

6 - Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are slightly erodible, and crops can easily be grown.

7 - Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are slightly erodible and crops can easily be grown.

8 - Stony or gravelly soils and other soils not subject to soil blowing.

APPENDIX D
WILDLIFE

APPENDIX D-1

METHODOLOGY - WILDLIFE

Wildlife data was compiled during a 1981 survey run at Level III of the Integrated Habitat Inventory Classification System (IHICS), BLM Manual 6602. BLM personnel conducted the survey.

Mapping

At the same time the IHICS survey was conducted, a range inventory crew mapped the Three-County area by soils and existing vegetation. Habitat sites were mapped following these soil-vegetation lines and classified into Standard Habitat Sites (SHS's) using the range crew's writeups on vegetation and soils. SHS's are a combination of vegetation and landform. Verification of SHS classification was done on the ground, and by using aerial photos and topographic maps.

Mammal Data

Rodent species occurrence was determined by running traplines of 100 traps in each SHS. Museum specials and rat traps were used; in addition a few lines of live traps were set. At the beginning of the survey, an objective of five transects per SHS was set. In most cases many more traplines were run with as many as 34 in the grass flat SHS. However, none were run in mesquite rolling upland, which was a fairly small SHS.

A number of nights were spent mist netting for bats. Fifteen of these were successful. Rodent and bat specimens were turned into the New Mexico State University (NMSU) Biology Department for verification. Big game, carnivores, and other mammal sightings were recorded by SHS as incidental observations.

Avian Data

Bird transects consisted of modified strip transects to determine species occurrence, seasonal use, and relative abundance by SHS. Incidental data was also recorded. Unusual sightings were forewarded to the New Mexico Ornithological Society.

Nesting surveys were run on foot, by vehicle, and by helicopter. Data was recorded on Cornell nest cards and forwarded to them through Dr. Hubbard of the New Mexico Department of Game and Fish (NMDGF).

Reptile and Amphibian Data

Can traps were set up in nine different SHS's. Many other specimens were collected either during night driving or incidental daytime observations. A total 210 specimens were deposited at the NMSU Biology Department Museum.

Standard Habitat Site (SHS) Comparisons

The information in this section was developed by analyzing data from vegetation transects run during the 1981-82 range inventory and wildlife transects from the 1981 IHICS inventory. When possible, data from 10 transects per SHS were used. Incidental wildlife observations were also used, especially for Table 2-8.

Comparison data for Table 2-7 was developed as follows:

Diversity Index - Wildlife Species

Odum (1963) presents the following method to compare species diversity in different ecosystems, or in the same ecosystem at different times.

$$\frac{\text{cumulative number of species}}{\text{individuals counted}} = \text{D. I.}$$

Odum (1963) recognized that other diversity indices have been proposed and that there are limitations such as bias in sampling techniques. The index numbers derived by using Odum's method provide for a comparison of common and rare species in a community, as related to another community (Table 2-7).

Using the examples of two hypothetical communities, Community A with 100 individuals (total) of 2 species, and Community B with 200 individuals of 8 species, the diversity index numbers would be .2 for A and .56 for B under the theory that presence of rare (infrequent) species in an ecosystem represents stability of the community. The examples above show that the B Community is more stable than A with a higher representation of rare species. An extreme example of the diversity index would be a well maintained corn field where the plant diversity is very low, consisting of many individuals of one species, and having low stability. The corn field population would be subject to heavy damage from adverse weather or by invasion of a disease or pest.

Individual diversity index numbers on Table 2-7 should be used for comparison between different Standard Habitat Sites (SHS's). Under the diversity index column for summer birds, the mesquite rolling upland SHS index is 1.50 and the grass mountain SHS index is 2.39, implying a "healthier" community in the latter (higher index number), at least for small mammals. Impacts can be assessed from diversity indices. If chemical brush control is conducted in the mesquite rolling upland SHS and results in a change to a grass rolling upland SHS, diversity of small mammals would increase.

Number of Vertebrate Species Using a SHS or Reliant on a SHS

IHICS data was compiled to determine a species list for each SHS. BLM data were supplemented by other sources, primarily Hubbard (1978) and Findley, et.al. (1975). From these lists, the total number of species using each SHS was determined. The species list in Appendix D-3 lists the SHS's used by a numerical designation. Those which only use one SHS were tallied by SHS to determine how many vertebrate species rely on a certain SHS as their preferred habitat.

Plant Comparison Data

Vegetation transects run during the range survey were separated by the SHS they fell into. Those which appeared to be atypical were discarded. Then 10 transects were chosen at random for each SHS (although only eight were found for mesquite sand dune and oak draw). Diversity index was determined by the same formula used for wildlife species. The average number of plant species was determined by counting the number of species on each transect and averaging them. The percent composition trees and shrubs by weight was derived from production data. Snakeweed was not included in the shrub production figure.

There is some inaccuracy in this method in that sometimes unknown species were lumped into the categories of annual forbs or annual grasses. Thus there might actually be a higher number of plant species and a higher diversity index. However, every SHS has plants lumped into these categories, so the adjustment for each SHS would probably be similar if it could be made.

Breakdown by Ecological Condition Class and SHS

Ecological condition class ratings are explained in Appendix B-4. A special computer program was written by Greg Hand of the BLM, Denver Service Center, to use digitized acreage information and categorize it in different ways. One of these categories was condition classes by SHS and another total acres in each SHS.

Big Game

The herd unit map and population figures were provided by the NMDGF and agreed on by the BLM. Present and optimum populations were distributed among the allotments in the population area using the method outlined in Appendix D-2 of the Southern Rio Grande Planning Area Grazing Environmental Impact Statement (BLM 1981).

Fecal analysis data from the Las Cruces District Files was used to determine what plant species are used by deer in this area. Then range survey data was checked to see how much production of these species occurred in the portions of each allotment that are within the big game population area. From these figures, big game numbers are distributed between allotments.

For example, present deer numbers in the Pyramids (on public land) are estimated at 73 deer. Production data showed that 28 percent of the forage was available on Allotment 1050. Seventy-three total deer X .28 equals 20 deer on Allotment 1050.

Allocations were developed as follows:

8(approximately) deer consume 780 lbs. forage/month
(8 deer = 1 Animal Unit (AU))

12 pronghorn consume 780 lbs. forage/month
(12 pronghorn = 1 AU)

On Allotment 1050, 20 deer X 12 months divided by 8 = 30 AUMs

For 2010 allocations, NMDGF population is used, and AU equivalents are increased. The Proposed Action should result in an increase in ecological condition. Dr. Marlin Springer, in a contrast report for the BLM Las Cruces District, concluded that on good condition rangeland in Southern New Mexico, considering diet differences, 17 deer or 19 pronghorn equal 1 AU. In the SHS's most important for deer, most acreage will not improve above fair, so a figure of 10 deer and 14 pronghorn was used.

For bighorn sheep allocations, carrying capacity estimates from Sandoval (1982) and Bavin (1982) were used. However, they took the total forage and figured that 50 percent of it would be available to sheep after plant maintenance needs and potential competition. This amount of forage appears to be too high. Allowable use figures for shrub species used by bighorns range from 28 percent on oak and 38 percent on winterfat to 50 percent on mountain mahogany. This means that half or less of the plant is available after plant maintenance needs are considered. Cattle graze many of the areas used by bighorn sheep, further reducing available forage. Therefore, Sandoval and Bavin's optimum sheep numbers were reduced by 50 percent for the Proposed Action. Under the Elimination of Livestock Grazing (ELG) Alternative, their optimum figures were used.

Chapter 3 Impacts

Table 3-8 was developed by comparing data from wildlife and vegetative transects in different condition classes. Wildlife transects were run before ecological condition class was determined; so in many cases all transects within a SHS ended up in the same condition class, and no comparison was possible.

The same vegetative transects used for comparison data in Table 2-8 were used for Table 3-8. In many cases, all of these were in poor and fair condition. When this was the case, good condition transects for that SHS were located. If there were more than five, five were randomly picked for analysis. If less than five were found, all were used.

Animal Unit Months (AUMs) for the ELG Alternative were calculated by: 1) estimating what percent of optimum big game numbers each species makes up; 2) multiplying that percentage by available AUMs for livestock (5-year average) and big game and 3) multiplying this AUM figure by a diet-adjusted Animal Unit Equivalent (AUE) computed for Southwestern New Mexico (Springer 1979). For example:

Mule Deer = 42% of big game population X 229,185
Total AUMs = 96,258 AUMs ÷ 16.7 AUE = 5,764 AUMs

Mule Deer = 42% X 229,185 = 96,258 ÷ 16.7 = 5,764
Whitetail Deer = 20% X 229,185 = 45,837 ÷ 27 = 1,698
Pronghorn = 1% X 229,185 = 2,292 ÷ 19.3 = 119
Ibex = 9% X 229,185 = 20,627 ÷ 27 = 764
Desert Bighorn Sheep = 17% X 229,185 = 38,961 ÷ 11.2 = 3,479
Javelina = 11% X 229,185 = 25,210 ÷ 45.6 = 553
12,377

There are several differences between this and other AUM calculations. Areawide game figures are used rather than the population area figures for other allocations. AUMs for ibex and javelina were not considered in any other alternative. And finally, there is no consideration for what quality and quantity of forage is actually available. Although there is a figure for diet overlap, for example 16.7 for mule deer, that does not guarantee that the plant species eaten by both cattle and deer are actually available. The bottom line is that there may not be as much forage as is allocated.

APPENDIX D-2

CORRESPONDENCE CONCERNING SECTION 7
CONSULTATION WITH THE U.S. FISH AND WILDLIFE SERVICE

March 3, 1849

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
District Office
P. O. Box 1420
Las Cruces, New Mexico
88004

IN REPLY REFER TO: 6500
x1608.1

June 2, 1982

Regional Director
U.S. Fish and Wildlife Service
Suite C, 3530 Pan American Hwy NE
Albuquerque, NM 87107

Dear Sir:

The Bureau of Land Management (BLM), in meeting the requirement of the Federal Land Policy and Management Act (FLPMA) of 1976 and the National Environmental Policy Act (NEPA) of 1970 (as amended), is preparing a Las Cruces-Lordsburg Management Framework Plan (MFP)/Environmental Impact Statement (EIS) to amend previous MFP's written on portions of the whole area (map enclosed).

Pursuant to Section 7 of the Endangered Species Act of 1973 (as amended), we are hereby requesting a formal list of candidate and listed species which potentially occupy the Las Cruces-Lordsburg Planning Area.

An abstract describing the alternatives including the Proposed Action is enclosed. Any questions regarding this request should be addressed to Linda Seibert, FTS 572-0257. She is the wildlife biologist on our staff who will be working on the MFP Amendment/EIS.

Sincerely yours,

/s/ Donnie R. Sparks

Daniel C. B. Rathbun
District Manager

Enclosures (3)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

IN REPLY REFER TO:
SE

July 27, 1982

ID 2-2-82-I-247

MEMORANDUM

TO : Daniel Rathbun, District Manager, Bureau of Land Management,
P.O. Box 1420, Las Cruces, New Mexico 88004

Acting
FROM : Regional Director, Region 2 (SE)

SUBJECT: Species List

This is in reply to your memorandum of July 7, 1982, which requested a list of federally listed and proposed species, as provided by the Endangered Species Act, that may be affected by a nonconstruction action. Your action involves Grant, Hidalgo, Luna, and Dona Ana Counties, New Mexico.

We have used the information in your request to narrow the list of listed and proposed species in the action area to those that potentially may be affected by your proposed action (see attachment).

If you have need of further assistance, please call the Office of Endangered Species at (505) 766-3972 or FTS 474-3972.

James L. Stegman

Attachment

cc: Area Manager, Phoenix Area Office (SE), Phoenix, AZ
Field Supervisor, Albuquerque Field Office (ES), Albuquerque, NM
Director, FWS, Washington, D.C. (OES)

Las Cruces-Lordsburg Planning Area MFP Amendment
Grant, Hidalgo, Luna, and Dona Ana Counties, New Mexico

LISTED SPECIES

Peregrine falcon (Falco peregrinus) - Occurs in Grant County.

New Mexican ridge-nosed rattlesnake (Crotalus willardi obscurus) - Occurs in Hidalgo County.

Whooping crane (Grus americana) - Occurs in Luna County.

Sneed pincushion cactus (Coryphantha sneedii var. sneedii) - Occurs in Dona Ana County.

PROPOSED SPECIES

None.

CRITICAL HABITAT

New Mexican ridge-nosed rattlesnake (Crotalus willardi obscurus) - An area between 6,200 feet and 8,532 feet in Bear, Indian, and Spring Canyons, Animas Mountains.

CANDIDATE SPECIES

Aster blepharophyllus - Hidalgo County.
Cereus greggii - Dona Ana, Hidalgo, and Luna Counties.
Cleome multicaulis - Dona Ana County.
Perityle cernua - Dona Ana County.
Oenothera organensis - Dona Ana County.
Opuntia arenaria - Dona Ana County.
Penstemon alamosensis - Dona Ana County.
Rosa stellata - Dona Ana County.
Vauquelinia pauciflora - Hidalgo County.
Pediocactus papyracanthus - Dona Ana and Grant Counties.
Silene wrightii - Grant and Luna County.

For further information concerning the above candidate plant species you may wish to contact Dr. Richard Spellenberg, New Mexico State University, Box 3AF, Las Cruces, New Mexico 88003.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

SE

January 21, 1983

2-2-82-I-247

MEMORANDUM

TO : Daniel Rathburn, District Manager, Bureau of Land Management,
P.O. Box 1420, Las Cruces, New Mexico 88004

FROM : Deputy Regional Director, Region 2 (SE)

SUBJECT: Las Cruces - Lordsburg Management Framework Plan

This is in response to Linda Siebert's January 12, 1983, call regarding the threatened and endangered species list we issued to your office July 27, 1982. The attached list supercedes the July list.

If you have need for further assistance, please call Mr. Richard Hoppe, Ecological Services, Albuquerque, 766-3966 (FTS 474-3966).

Jerry L. Stegman

Attachment

cc: Field Supervisor, Ecological Services, Albuquerque, New Mexico
Director, FWS, Washington, D.C. (OES)

Las Cruces-Lordsburg Planning Area MFP Amendment
Grant, Hidalgo, Luna, and Dona Ana Counties, New Mexico

LISTED SPECIES

Peregrine falcon (Falco peregrinus) - Occurs in Grant County.

New Mexican ridge-nosed rattlesnake (Crotalus willardi obscurus) - Resides in the Animas Mountains, Hidalgo County.

Whooping crane (Grus americana) - Occurs in Luna County and may also be found in Dona Ana County as a winter migrant.

Sneed pincushion cactus (Coryphantha sneedii var. sneedii) - Occurs in Dona Ana County on limestone ledges at elevations of 4,300 to 5,400 feet.

Bald eagle (Haliaeetus leucocephalus) - Occurs in Dona Ana and Grant Counties as a winter migrant.

PROPOSED SPECIES AND PROPOSED CRITICAL HABITAT

Chihuahua chub (Gila nigrescens) - Occurs in Grant County in a three mile segment of the Mimbres River above the town of Mimbres.

CRITICAL HABITAT

New Mexican ridge-nosed rattlesnake (Crotalus willardi obscurus) - An area between 6,200 feet and 8,532 feet in Bear, Indian, and Spring Canyons, Animas Mountains.

CANDIDATE SPECIES

*Aster blepharophyllus - Hidalgo County, Las Playas Springs.
*Cereus greggii - Dona Ana, Hidalgo, and Luna Counties, elevation 4,000 - 4,500 feet.
*Cleome multicaulis - Dona Ana County.
Perityle cernua - Dona Ana County, Organ Mountains (Long Canyon).
Oenothera organensis - Dona Ana County, Organ Mountains, 6,000 - 7,500 feet elevation.
Opuntia arenaria - Dona Ana County, Rio Grande Valley and Franklin Mountains.
Penstemon alamosensis - Dona Ana County, open rock slopes, elevation 4,500 - 6,100 feet.
*Rosa stellata - Dona Ana County, San Andres Mountains, 6,000 - 8,000 feet elevation.
Vauquelinia pauciflora - Hidalgo County, Peloncillo Mountains, elevation 4,100 - 6,100 feet.
Pediocactus papyracanthus - Dona Ana and Grant Counties.
Scrophularia macrantha - Grant and Luna County, Dry, steep hillsides around rocks. About 6,500 - 7,500 feet elevation.

Spotted bat (Euderma maculatum) - Dona Ana County.
Spikedace (Meda fulgida) - Grant County, main Gila River above Cliff and East and Middle forks of Gila River.
Loach minnow (Tiaroga cobitis) - Grants County, tributaries of Gila and San Francisco Rivers.

Candidate plant species include categories 1 and 2*.

For further information concerning the above candidate plant species you may wish to contact Dr. Richard Spellenberg, New Mexico State University, Box 3AF, Las Cruces, New Mexico 88003.

APPENDIX D-2 (continued)

FEDERALLY-LISTED THREATENED OR ENDANGERED AND CANDIDATE ANIMALS POTENTIALLY OCCURRING IN THE RESOURCE AREA

(From List Request)
Determination of Effect

1. Peregrine falcon (*Falco peregrinus*) - may affect
2. New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)/Critical Habitat - no effect
3. Whooping crane (*Grus americana*) - no effect
4. Loach minnow (*Tiaroga cobitis*) (C) - may affect (beneficial)
5. Spikedace (*Meda fulgida*) (C) - may affect (beneficial)
6. Bald eagle (*Haliaeetus leucocephalus*) - no effect
7. Chihuahua chub (*Gila nigrescens*)/Critical Habitat (P) - may affect
8. Spotted bat (*Euderma maculatum*) (C) - may affect (beneficial)

FEDERALLY-LISTED THREATENED OR ENDANGERED AND CANDIDATE PLANTS POTENTIALLY OCCURRING IN THE RESOURCE AREA

1. *Coryphantha sneedii* var. *sneedii* (Sneed pincushion cactus) - may affect
2. *Aster blepharophyllus* (C) - no effect
3. *Cereus greggii* (Night-blooming cereus) (C) - may affect
4. *Cleome multicaulis* (Spider flower) (C) - no effect
5. *Perityle cernua* (Rock daisy) (C) - no effect
6. *Oenothera organensis* (Organ Mt. primrose) (C) - may affect
7. *Penstemon alamosensis* (Beard-tongue) (C) - no effect
8. *Rosa stellata* (Desert rose) (C) - no effect
9. *Vauquelinia pauciflora* (Mexican rosewood) (C) - may affect
10. *Pediocactus papyracanthus* (Grama grass cactus) (C) - no effect
11. *Opuntia arenaria* (Club cholla) (C) - may affect
12. *Scrophularia macrantha* (C) - no effect

STATE-LISTED THREATENED OR ENDANGERED ANIMALS

1. Arizona shrew (Sorex arizonae) NM 2 - no effect
2. Southern yellow bat (Lasiurus ega xanthinus) NM 2 - may affect (beneficial)
3. Western mastiff bat (Eumops perotis californicus) NM 2 - no effect
4. White-sided jackrabbit (Lepus callotis gaillardi) NM 1 - no effect
5. Southern pocket gopher (Thomomys umbrinus emotus) NM 2 - no effect
6. Coatimundi (Nasua naric molaris) NM 2 - may affect (beneficial)
7. River otter (Lutra canadensis sonora) NM 1 - no effect
8. Desert bighorn sheep (Ovis canadensis mexicana) NM 1 - may affect
9. Olivaceous cormorant (Phalacrocorax olivaceus) NM 2 - may affect (beneficial)
10. Mississippi kite (Ictinia misisippiensis) NM 2 - may affect (beneficial)
11. Gray hawk (Buteo nitidus maximus) NM 1 - may affect (beneficial)
12. Black hawk (Buteogallus anthracinus) NM 1 - may affect (beneficial)
13. Aplomado falcon (Falco femoralis septentrionalis) NM 1 - no effect
14. (Mexican) turkey (Meleagris gallopavo mexicana) NM 2 - may affect (beneficial)
15. Ridgway's whip-poor-will (Caprimulgus ridgwayi) NM 2 - may affect (beneficial)
16. Violet-crowned hummingbird (Amazilia violiceps ellioti) NM 2 - may affect (beneficial)
17. White-eared hummingbird (Hylocharis leucotis) NM 1 - no effect
18. Broad-billed hummingbird (Cyanthus latirostris) NM 2 - may affect (beneficial)
19. Coppery-tailed trogon (Trogon elegans canescens) NM 1 - no effect
20. Gila woodpecker (Melanerpes uropygialis uropygialis) NM 2- no effect
21. Thick-billed kingbird (Tyrannus crassirostris pompalis) NM 2 - may affect (beneficial)
22. Sulphur-bellied flycatcher (Myiodynastes luteiventris swarthi) NM 1 - may affect (beneficial)
23. Buff-breasted flycatcher (Empidonax fulvifrons pygmaeus) NM 1 - no effect
24. Beardless flycatcher - (Camptostoma imberbe ridgwayi) NM 1- may affect (beneficial)

25. Bell's vireo (Vireo bellii) NM 2 - No effect
26. Varied bunting (Passerina versicolor) NM 2 - no effect
27. Baird's sparrow (Ammodramus bairdii) NM 2 - may affect (beneficial)
28. Yellow-eyed junco (Junco phaeonotus palliatus) NM 2 - no effect
29. McCown's longspur (Calcarius mccownii) NM 2- may affect (beneficial)
30. Bunchgrass lizard (Sceloporus scalaris) NM 2 - no effect
31. Mountain skink (Eumeces callicephalus) NM 2 - may affect (beneficial)
32. Giant spotted whiptail lizard (Cnemidophorus burti strictogrammus) NM 2 - may affect (beneficial)
33. Dixon's whiptail lizard (Cnemidophorus dixoni) NM 2 - may affect
34. Gila monster (Heloderma suspectum) NM 1 - may affect
35. Narrow-headed garter snake (Thamnophis rufipunctatus) NM 2 - may affect (beneficial)
36. (Sonora) coachwhip (Masticophis flagellum cingulum) NM 2 - no effect
37. Trans-Pecos ratsnake (Elaphe subocularis) NM 2 - may affect
38. Sonora Mountain kingsnake (Lampropeltis pyromelana pyromelana) NM 2 - no effect
39. (Arizona black) western rattlesnake (Crotalus viridis cerberus) NM 2 - no effect
40. Colorado river toad (Bufo alvarius) NM 2 - no effect
41. Mexican tetra (Astyanax mexicanus) NM 2 - no effect
42. Roundtail chub (Gila robusta grahami) NM 2 - may affect (beneficial)
43. Gila chub (Gila intermedia) NM 1 - may affect (beneficial)
44. Chihuahua chub (Gila nigrescens) NM 1 - no effect
45. Bluntnose shiner (Notropis simus) NM 1 - no effect

STATE-LISTED SPECIAL CONCERN ELEMENT PLANTS AND ANIMALS

(New Mexico Heritage Program)

1. Acacia angustissima suffrutescens Peripheral - narrow - no effect
2. Acacia millefolia Peripheral - narrow - no effect

3. Ageraturn corymbosum Peripheral - narrow - no effect
4. Aletes filifolius State sensitive - no effect
5. Amsonia arenaria Endemic 2 - may affect
6. Arabis angulata Endemic 1 - no effect
7. Aspicarpa hirtella Peripheral - no effect
8. Astragalus cobrensis maguirei Endemic 2 - may affect
9. Brachystigma wrightii Peripheral - narrow - no effect
10. Brickellia lemmonii Endemic 2 - may affect
11. Brickellia simplex Peripheral - narrow - may affect
12. Calandrinia ciliata menziesii Peripheral - narrow - may affect
13. Castilleja organorum Endemic 1 - may affect (beneficial)
14. Cerastium texanum Peripheral - narrow - no effect
15. Cheilanthes pringlei (Pringle's cheilanthes) Endemic 2 - no effect
16. Coryphantha orcuttii koenigii Endemic 1 - no effect
17. Coryphantha orcuttii macraxina Endemic 1 - no effect
18. Coryphantha orcuttii orcuttii Endemic 2 - no effect
19. Coryphantha organensis Endemic 1 - may affect (beneficial)
20. Cuphea wrightii Peripheral - narrow - no effect
21. Cupressus arizonica (Arizona cypress) Peripheral - broad - no effect
22. Dalea pulchra Peripheral - narrow - no effect
23. Delphinium occidentale quercicola Endemic 1 - no effect
24. Draba standleyi Endemic 1 - may affect (beneficial)
25. Echinocereus lloydii (Lloyd's hedgehog cactus) Endemic 2 - may affect
26. Erysimum desertorum Endemic 1 - may affect
27. Eustoma exaltatum (Prairie gentian) Rare - may affect
28. Eysenhardia polystachya (Kidney wood) Peripheral - narrow - may affect
29. Gomphrema sonorae Peripheral - narrow - may affect

30. Ipomopsis macombii Peripheral - narrow - may affect
31. Jatropha macrorhiza Peripheral - narrow - no effect
32. Mammillaria heyderi bullingtoniana Peripheral - broad - may affect (beneficial)
33. Mammillaria heyderi macdougalii Peripheral - narrow - may affect
34. Mecardonia vandellioides Peripheral - narrow - may affect
35. Metastelma arizonicum Peripheral - narrow - no effect
36. Milla biflora (Mexican star lily) Peripheral - narrow - no effect
37. Mimulus cordatus Endemic 1 - may affect
38. Mimosa grahamii Endemic 2 no effect
39. Opuntia wootonii Endemic 1 - may affect (beneficial)
40. Oxalis pilosa Peripheral - narrow - may affect
41. Pectocarya recurvata Peripheral - narrow - may affect
42. Penstemon dasyphyllus Endemic 2 - may affect
43. Penstemon lanceolatus Endemic 2 - may affect
44. Penstemon superbus Peripheral - narrow - may affect
45. Perityle lemmonii State sensitive - may affect (beneficial)
46. Phacelia intermedia Endemic 2 - may affect
47. Phacelia tenuipes Endemic 1 - may affect
48. Phanerophlebia auriculata Peripheral - narrow - may affect (beneficial)
49. Philadelphus argentatus Peripheral - narrow - no effect
50. Philadelphus mearnsii Endemic 2 - no effect
51. Pinus edulis fallax Endemic 2 - no effect
52. Plummera ambigens Endemic 2 - may affect
53. Porophyllum gracile Peripheral - narrow - may affect
54. Porophyllum ruderale macrocephalum Peripheral - narrow - may affect

55. *Rubus exrubicundus* Endemic 2 - may affect (beneficial)
56. *Sageretia wrightii* Peripheral - narrow - no effect
57. *Schistophragma intermedia* Endemic 2 - may affect
58. *Scrophularia laevis* Endemic 1 - may affect (beneficial)
59. *Senecio salignus* Peripheral - narrow - no effect
60. *Sicyos glaber* Endemic 1 - may affect (beneficial)
61. *Silene plankii* Endemic 1 - no effect
62. *Silene thurberi* Peripheral - narrow - no effect
63. *Sphaeralcea emoryi variabilis* Peripheral - narrow - may affect
64. *Sphaeralcea procera* Endemic 1 - may affect
65. *Stipa curvifolia* Endemic 2 - may affect
66. *Talinum longipes* Endemic 1 - may affect
67. *Tiquilia gossypina* Peripheral - narrow - may affect

APPENDIX D-3

WILDLIFE SPECIES LIST FOR LAS CRUCES/LORDSBURG RESOURCE AREA*

The following list was compiled from the Integrated Habitat Inventory Classification System (IHICS) survey of 1981. It also includes other known sightings or collections verified by the BLM, Las Cruces District, by Hubbard, or by Findley, et al. Numbers refer to Standard Habitat Sites (SHS). Reference for reptile and amphibian names: Behler, John L., and King, F. Wayne. The Audubon Society Field Guide to North American Reptiles and Amphibians, New York, Alfred A. Knopf, 1979.

Key: Standard Habitat Sites - (1) Creosote Rolling Upland; (4) Mixed Shrub Mountain; (5) Mixed Shrub Rolling Upland; (6) Mixed Shrub Hill; (7) Half Shrub Rolling Upland; (9) Mesquite Rolling Upland; (10) Mesquite Sand Dunes; (11) Grass Flat; (12) Grass Rolling Upland; (13) Grass Mountain; (14) Pinyon-Juniper Grass Mountain; (15) Pseudoriparian; (16) Riparian; (18) Oak Draw; (20) Conifer Mountain.

Notes: V - Verified during 1981 IHICS survey.

H - Hypothetical. Probably occurs in the 3-County Area although unverified; or has occurred historically.

* - Inclusive for public land in Grant, Hidalgo and Luna Counties. For Dona Ana County, see Appendix D-1 of Southern Rio Grande Planning Area Draft Grazing Environmental Impact Statement, 1981.

Sources: Hubbard, J. P., Revised Checklist of the Birds of New Mexico. N.M. Ornithological Society Publication, No. 6, Albuquerque, N.M., McLeod Printing Co., 1978.

Findley, J. S., Harris, A. H.: Wilson, D. E. and Jones C., Mammals of New Mexico., Albuquerque, N.M.: University of New Mexico Press, 1975.

WILDLIFE SPECIES LIST FOR LAS CRUCES/LORDSBURG RESOURCE AREA*

BIRD SPECIES

Common Loon	16	
Eared Grebe	16	
Least Grebe	16	H
Pied-billed Grebe	16	V
Brown Pelican		
Double-crested Cormorant	16	
Olivaceous Cormorant		
Great Blue Heron	16	V
Green Heron	16	
Cattle Egret	16	
Great Egret	16	
Snowy Egret	16	
Black-crowned Night Heron	16	V
Least Bittern	16	
American Bittern	16	
Wood Stork	16	
White-faced Ibis	16	
Whistling Swan	16	V
Canada Goose	16	V
White-fronted Goose	16	
Snow Goose	16	V
Ross Goose	16	
Black-bellied Whistling Duck	16	H
Mallard	16	V
Gadwall	16	V
Pintail	16	V
Green-winged Teal	16	V
Blue-winged Teal	16	V
Cinnamon Teal	16	V
American Wigeon	16	V
Northern Shoveler	16	V
Redhead	16	
Ring-necked Duck	16	V
Canvasback	16	
Lesser Scaup	16	
Common Goldeneye	16	
Bufflehead	16	V
Ruddy Duck	16	
Hooded Merganser	16	
Common Merganser	16	
Red-breasted Merganser	16	H
Turkey Vulture	All SHS's	V
Black Vulture		H
White-tailed Kite		H
Mississippi Kite	16	
Goshawk	16, 20	V
Sharp-shinned Hawk	1, 4, 5, 7, 9, 10, 11, 12, 15, 16 18, 20	V
Cooper's Hawk	4, 5, 7, 9, 10, 11, 12, 15, 16, 18, 20	V
Red-tailed Hawk	All SHS	V
Swainson's Hawk	1, 4, 5, 7, 9, 10, 11, 12, 15, 16	V
Zone-tailed Hawk	4, 13, 15, 16, 18, 20	V
White-tailed Hawk	11, 12	H
Rough-legged Hawk	1, 5, 7, 9, 10, 11, 12	V
Ferruginous Hawk	1, 5, 7, 9, 10, 11, 12	V
Gray Hawk	16	
Harris Hawk	9, 16	V
Black Hawk	16	V
Golden Eagle	Most SHS's	V
Bald Eagle	16	
Marsh Hawk	1, 4, 5, 7, 9, 11, 12, 13, 15, 16	V
Osprey	16	
Caracara	11, 12	
Prairie Falcon	1, 4, 5, 9, 10, 11, 12, 13, 15	V
Peregrine Falcon	4, 7, 11, 15, 16, 20	
Aplomado Falcon	11, 12	
Merlin	16, 18	
American Kestrel	All SHS's	V
Scaled Quail	Most SHS's	V
Gambel's Quail	Most SHS's	V
Montezuma Quail	4, 13, 14, 18, 20	V
Ring-necked Pheasant	16	V
Wild Turkey	18, 20	
Whooping Crane	7, 11	
Sandhill Crane	7, 11, 16	V
Virginia Rail	16	
Sora	16	
Common Gallinule	16	
American Coot	16	V
American Oystercatcher		H
Semi-palmated Plover	11, 16	
Snowy Plover	11	

Killdeer	4, 7, 11, 12, 14, 15, 16	V
Mountain Plover	7, 11, 12	
Black-bellied Plover	7, 11	
Common Snipe	16	
Long-billed Curlew	7, 11, 12, 16	
Whimbrel	11, 16	V
Upland Sandpiper	7, 11, 12	
Spotted Sandpiper	16	V
Solitary Sandpiper	11, 16	
Greater Yellowlegs	11, 16	V
Lesser Yellowlegs	11, 16	V
Willet	16	
Pectoral Sandpiper	16	
Baird's Sandpiper	16	
Least Sandpiper	11, 16	V
Dunlin	11, 16	V
Western Sandpiper	11, 16	V
Sanderling	16	
Long-billed Dowitcher	11, 16	V
Marbled Godwit	16	
American Avocet	11, 16	V
Black-necked Stilt	11, 16	H
Red Phalarope	11	V
Wilson's Phalarope	11, 16	
Northern Phalarope	11, 16	
Herring Gull	16	H
Ring-billed Gull	16	
Franklin's Gull	16	
Forster's Tern	16	
Black Tern	16	
Band-tailed Pigeon	4, 14, 15, 18	V
White-winged Dove	15, 16, 18	V
Mourning Dove	Most SHS's	V
Ground Dove	4, 11, 16	V
Thick-billed Parrot		H
Yellow-billed Cuckoo	16	
Roadrunner	Most SHS's	V
Groove-billed Ani	No SHS data	
Barn Owl	Most SHS's	V
Screech Owl	16, 18	V
Whiskered Owl	4, 14	
Flammulated Owl	20	
Great Horned Owl	All SHS's	V
Pygmy Owl	14, 20	
Elf Owl	4, 14, 16, 18	V
Burrowing Owl	1, 5, 7, 9, 11, 12	V
Long-eared Owl	4, 15, 16, 18	V
Short-eared Owl	7, 11, 12	V
Saw-whet Owl	16, 20	
Whip-poor-will	4, 16, 18, 20	
Buff-collared Nightjar	4	
Poor-Will	Most SHS's	V
Common Nighthawk	Most SHS's	V
Lesser Nighthawk	1, 5, 7, 9, 10, 11, 12, 15, 16	V
White-throated Swift	1, 4, 5, 7, 13, 14, 15, 16, 20	V
Black-chinned Hummingbird	4, 5, 9, 10, 14, 15, 16, 18	V
Costa's Hummingbird	4, 16	
Broad-tailed Hummingbird	4, 5, 14, 15, 16, 18	V
Rufous Hummingbird	4, 5, 7, 13, 14, 15, 16, 18, 20	V
Calliope Hummingbird	4, 14, 18, 20	
Rivoli's Hummingbird	20	
Blue-throated Hummingbird		
Violet-crowned Hummingbird	16	V
Broad-billed Hummingbird	16	V
Coppery-tailed Trogon	16	
Belted Kingfisher	16	V
Common Flicker	1, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 18	V
Gila Woodpecker	16	V
Acorn Woodpecker	4, 16, 18, 20	V
Lewis' Woodpecker	4, 15, 16, 18, 20	
Yellow-bellied Sapsucker	4, 15, 16, 18, 20	V
Williamson's Sapsucker	16, 20	
Hairy Woodpecker	4, 16, 18, 20	V
Downy Woodpecker	20	
Ladder-backed Woodpecker	1, 4, 5, 9, 10, 12, 13, 14, 15, 16, 18, 20	V
Arizona Woodpecker	14, 16	
Vermilion Flycatcher	5, 15, 16	V
Sulphur-bellied Flycatcher	16	
Western Kingbird	Most SHS's	V
Cassin's Kingbird	4, 13, 14, 15, 16, 18, 20	V
Thick-billed Kingbird	16	V

APPENDIX D-3 (continued)

WILDLIFE SPECIES LIST FOR LAS CRUCES/LORDSBURG RESOURCE AREA*

BIRD SPECIES

Wied's Crested Flycatcher	15, 16	V
Ash-throated Flycatcher	1, 4, 5, 7, 9, 10, 11, 13, 15, 16, 18, 20	V
Olivaceous Flycatcher	4, 16	V
Black Phoebe	4, 5, 14, 15, 16	V
Say's Phoebe	All SHS's	V
Hammond's Flycatcher	4, 5, 9, 10, 14, 15, 18, 20	
Dusky Flycatcher	4, 5, 9, 10, 14, 15, 16, 18	
Gray Flycatcher	4, 5, 10, 14, 15, 16, 18, 20	
Western Flycatcher	4, 5, 14, 15, 16, 18, 20	V
Willow Flycatcher	5, 9, 10, 14, 15, 18	
Beardless Flycatcher	16	
Western Wood Pewee	4, 5, 9, 10, 14, 15, 16, 18, 20	V
Olive-sided Flycatcher	4, 16, 18, 20	
Horned Lark	1, 4, 5, 7, 9, 10, 11, 12, 13, 15	V
Barn Swallow	4, 5, 16	V
Cliff Swallow	5, 16	V
Violet-green Swallow	4, 7, 14, 15, 16, 18, 20	V
Tree Swallow	4, 16, 18, 20	V
Bank Swallow	16	
Rough-winged Swallow	5, 16	V
Purple Martin	16, 18, 20	
Steller's Jay	4, 5, 9, 10, 12, 14, 15, 16, 18, 20	V
Scrub Jay	1, 4, 5, 7, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20	V
Mexican Jay	4	V
Common Raven	1, 5, 7, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20	V
White-necked Raven	1, 4, 5, 7, 9, 10, 11, 12, 13, 14, 15, 16	V
Common Crow	16	V
Pinyon Jay	4, 14, 20	V
Mountain Chickadee	14, 20	V
Plain Titmouse	4, 13, 14, 15, 16, 18, 20	V
Bridled Titmouse	14	V
Verdin	1, 4, 5, 9, 10, 13, 15	V
Bushtit	1, 4, 14, 15, 18, 20	V
White-breasted Nuthatch	4, 9, 14, 18, 20	V
Brown Creeper	18, 20	V
Dipper	16	
House Wren	4, 15, 18, 20	V
Bewick's Wren	1, 4, 5, 9, 10, 14, 15, 16, 18	V
Cactus Wren	1, 4, 5, 7, 9, 10, 11, 12, 13, 15, 16, 18	V
Rock Wren	1, 4, 5, 7, 12, 13, 14, 15, 16, 18	V
Canyon Wren	1, 4, 5, 7, 12, 13, 14, 15, 18	V
Long-billed Marsh Wren	16	V
Northern Mockingbird	All SHS's	V
Sage Thrasher	1, 4, 5, 7, 9, 10, 13, 14, 15, 18	V
Bendire's Thrasher	1, 5, 9, 10, 15	V
Curve-billed Thrasher	1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16	V
Crissal Thrasher	1, 4, 5, 6, 7, 9, 10, 12, 13, 14, 15, 16	V
American Robin	4, 7, 14, 15, 16, 18, 20	V
Townsend's Solitaire	4, 5, 13, 14, 15, 16, 18	V
Hermit Thrush	4, 15, 16, 18, 20	V
Swainson's Thrush	4, 18	
Western Bluebird	4, 12, 13, 14, 15, 16, 18, 20	V
Mountain Bluebird	4, 5, 7, 11, 12, 13, 14, 18, 20	V
Blue-gray Gnatcatcher	4, 5, 15, 16, 18	
Black-tailed Gnatcatcher	9, 10, 15, 16	V
Golden-crowned Kinglet	20	
Ruby-crowned Kinglet	1, 4, 5, 9, 10, 13, 14, 15, 16, 18, 20	V
Water Pipit	11, 12, 13, 16	V
Sprague's Pipit	12	
Cedar Waxwing	14, 15, 16, 18, 20	V
Phainopepla	4, 9, 10, 13, 14, 15, 16, 18	V
Loggerhead Shrike	All SHS's	V
Starling	16	V
Gray Vireo	4, 14, 16, 18	V
Solitary Vireo	4, 5, 14, 15, 16, 18, 20	V
Bell's Vireo	4, 16	V
Hutton's Vireo	4, 16, 18	V
Warbling Vireo	4, 14, 16, 18, 20	V
Black and White Warbler	18	
Orange-crowned Warbler	4, 5, 9, 10, 14, 15, 16, 18, 20	V

Nashville Warbler	4, 14, 16, 18, 20	V
Virginia's Warbler	4, 5, 7, 9, 10, 14, 15, 16, 18, 20	V
Lucy's Warbler	4, 5, 9, 10, 15, 16	V
Parula Warbler	4, 18	V
Yellow Warbler	16	V
Yellow-rumped Warbler	All SHS's	V
Townsend's Warbler	4, 16, 18, 20	V
Black-throated Green Warbler	14, 16	
Black-throated Gray Warbler	4, 14, 16, 18, 20	V
Grace's Warbler	4, 14, 16, 18, 20	V
Hermit Warbler	14, 20	V
Yellowthroat	16	V
Yellow-breasted Chat	16	V
MacGillivray's Warbler	1, 4, 5, 9, 10, 14, 15, 18	V
Wilson's Warbler	4, 5, 9, 10, 13, 14, 15, 18, 20	V
Red-faced Warbler	20	V
American Redstart	4, 18	V
Painted Redstart	16, 18, 20	V
House Sparrow	4, 16	V
Eastern Meadowlark	1, 5, 7, 11, 12, 15	V
Western Meadowlark	1, 5, 7, 9, 10, 12, 13, 15	V
Yellow-headed Blackbird	16	V
Red-winged Blackbird	16	V
Brewer's Blackbird	7, 9, 10, 11, 15, 16, 20	V
Great-tailed Grackle	16	V
Brown-headed Cowbird	1, 4, 5, 9, 10, 11, 13, 14, 15 16, 18	V
Bronzed Cowbird	4, 5, 10, 12, 14, 15	V
Orchard Oriole	16	
Scott's Oriole	1, 4, 5, 7, 9, 10, 11, 12, 13, 14, 15, 16, 18	V
Hooded Oriole	15, 16	V
Northern Oriole	5, 15, 16	V
Western Tanager	1, 4, 5, 10, 12, 14, 15, 16, 18, 20	V
Summer Tanager	16	V
Hepatic Tanager	4, 14, 18, 20	V
Cardinal	5, 15, 16	V
Pyrrhuloxia	4, 5, 9, 10, 11, 15, 16	V
Rose-breasted Grosbeak	4, 18, 20	V
Black-headed Grosbeak	4, 5, 13, 14, 15, 16, 18, 20	V
Evening Grosbeak	14, 16, 20	
Blue Grosbeak	4, 5, 9, 10, 11, 15, 16	V
Lazuli Bunting	5, 9, 10, 15	V
Varied Bunting	15	V
Painted Bunting	16	
House Finch	All SHS's	V
Pine Siskin	4, 14, 15, 16, 18, 20	V
American Goldfinch	4, 15, 16, 18	
Lesser Goldfinch	4, 5, 9, 10, 11, 14, 15, 16, 18, 20	V
Lawrence's Goldfinch	4, 14, 16	V
Dickcissel	5, 9, 10	
Green-tailed Towhee	4, 5, 7, 9, 10, 11, 15, 18, 20	V
Rufous-sided Towhee	4, 5, 13, 14, 15, 16, 18, 20	V
Brown Towhee	Most SHS's	V
Abert's Towhee	16	V
Savannah Sparrow	7, 11, 16	V
Grasshopper Sparrow	11	
Baird's Sparrow	12	
Lark Bunting	Most SHS's	V
Vesper Sparrow	Most SHS's	V
Lark Sparrow	Most SHS's	V
Black-throated Sparrow	Most SHS's	V
Sage Sparrow	1, 5, 7, 9, 10, 11, 12, 15	V
Dark-eyed Junco	4, 5, 7, 13, 14, 15	V
Gray-headed Junco	4, 14	V
Yellow-eyed Junco	4, 14	V
Rufous-crowned Sparrow	4, 13, 14, 15, 18	V
Cassin's Sparrow	1, 5, 11, 12, 15	V
Chipping Sparrow	1, 4, 5, 7, 9, 11, 13, 14, 15, 16, 18	V
Clay-colored Sparrow	1, 5, 9, 15, 16	
Brewer's Sparrow	1, 4, 5, 6, 7, 9, 11, 13, 14, 15 16, 18	V
Black-chinned Sparrow	4, 13, 14, 15, 16, 18, 20	V
White-crowned Sparrow	1, 4, 5, 6, 7, 9, 13, 15, 18	V
Lincoln's Sparrow	4, 15, 16	V
Song Sparrow	11, 16	V
McCown's Longspur	11, 12	
Chestnut-collared Longspur	11, 12	V

WILDLIFE SPECIES LIST FOR LAS CRUCES/LORDSBURG RESOURCE AREA*

MAMMALS

Desert Shrew	All SHS's	Notiosorex crawfordi	V
Long-tongued Bat	4, 6, 14, 18	Choeronycteris mexicana	
Sanborn's Long-nosed Bat	4, 6, 15, 18	Leptonycteris sanborni	
Southwestern Myotis	14, 20	Myotis auriculus	
California Myotis	All SHS's	M. californicus	V
Long-legged Myotis	4, 5, 11, 12, 14, 15, 16, 18, 20	M. volans	V
Small-footed Myotis	All SHS's	M. leibii	V
Little Brown Myotis	All SHS's	M. lucifugus	
Fringe-tailed Myotis	All SHS's	M. thysanodes	V
Yuma Myotis	1, 4, 11, 12, 14, 15, 16, 18, 20	M. yumanensis	V
Cave Myotis	1, 4, 5, 6, 11, 12, 15, 16, 18	M. velifer	
Silver-haired Bat	4, 14, 16, 18, 20	Lasionycteris noctivagans	V
Western Pipistrelle	All SHS's	Pipistrellus hesperus	V
Big Brown Bat	4, 14, 15, 16, 18, 20	Eptesicus fuscus	V
Hoary Bat	All SHS's	Lasiurus cinereus	V
Southern Yellow Bat	16	L. ega	V
Townsend's Big-eared Bat	All SHS's	Plecotus townsendii	
Spotted Bat	14, 16, 20	Euderma maculatum	
Pallid Bat	All SHS's	Antrozous pallidus	V
Brazilian Free-tailed Bat	1, 4-6, 7, 9-15	Tadarida brasiliensis	V
Pocketed Free-tailed Bat	16	T. femorosacca	
Big Free-tailed Bat	All SHS's	T. macrotis	
Western Mastiff Bat	4	Eumops perotis	
Eastern Cottontail	4, 13, 14, 20	Sylvilagus floridanus	
Desert Cottontail	Most SHS's	S. auduboni	V
Black-tailed Jackrabbit	Most SHS's	Lepus californicus	V
White-sided Jackrabbit	11, 12	L. callotis	H
Cliff Chipmunk	4, 6, 13, 14-16, 18, 20	Eutamias dorsalis	V
Gray-collared Chipmunk	20	E. cinereicollis	
Harris Antelope Ground Squirrel	1, 4-7	Ammospermoplilus harrisii	V
Abert's Squirrel	20	Sciurus aberti	H
Rock Squirrel	All SHS's	Spermophilus variegatus	V
Spotted Ground Squirrel	1, 4-6, 7, 9-12, 15, 16	S. spilosoma	V
Botta's Pocket Gopher	All SHS's	Thomomys bottae	V
Desert Pocket Gopher	Most SHS's	Geomys arenarius	
Silky Pocket Mouse	All SHS's	Perognathus flavus	V
Plains Pocket Mouse	1, 7, 9-15	P. flavescens	
Rock Pocket Mouse	1, 4-6, 13-16, 18	P. intermedius	V
Hispid Pocket Mouse	11, 12	P. hispidus	
Bailey's Pocket Mouse	4, 13	P. baileyi	V
Desert Pocket Mouse	1, 5, 6, 9, 10, 13, 15, 16	P. penicillatus	V
Ord's Kangaroo Rat	1, 5-7, 9-12, 14-16	Dipodomys ordii	V
Merriam's Kangaroo Rat	Most SHS's	D. merriami	V
Bannertail Kangaroo Rat	1, 7, 9-12	D. spectabilis	V
Beaver	16	Castor canadensis	
Western Harvest Mouse	All SHS's	Reithrodontomys megalotis	V
Plains Harvest Mouse	7, 11	R. montanus	
Fulvous Harvest Mouse	4, 13	R. fulvescens	
Cactus Mouse	Most SHS's	Peromyscus eremicus	V
Deer Mouse	All SHS's	P. maniculatus	V
White-footed Mouse	1, 5-7, 10-12, 16, 18, 20	P. leucopus	V
Brush Mouse	4-5, 13-16, 18	P. boylii	V
Pinyon Mouse	4, 13, 14, 18	P. truei	V
Rock Mouse	4, 13, 14, 18	P. difficilis	
Northern Pygmy Mouse	11	Baiomys taylori	V
Northern Grasshopper Mouse	1, 5, 6, 7, 9-13, 15	Onychomys leucogaster	V
Southern Grasshopper Mouse	1, 5, 7, 9-13, 15	O. torridus	V
Hispid Cotton Rat	11-13, 15, 16	Sigmodon hispidus	V
Tawny-bellied Cotton Rat	11, 12	S. fulviventer	
Yellow-nosed Cotton Rat	4, 13	S. ochrognathus	
White-throated Woodrat	1, 4-7, 9-13, 15, 18	Neotoma albigula	V
Southern Plains Woodrat	4, 5, 11, 12	N. micropus	V
Mexican Woodrat	4, 14, 20	N. mexicana	V
Stephens' Woodrat	4, 14	N. stephensi	V
Porcupine	All SHS's	Erethizon dorsatum	V
Coyote	All SHS's	Canis latrans	V
Gray Wolf	4	C. lupus	H
Kit Fox	1, 5-7, 9-12	Vulpes macrotis	V
Gray Fox	1, 4-6, 13, 15, 18	Urocyon cinereoargenteus	
Black Bear	14-16, 18, 20	Ursus americanus	V
Ringtail	1, 4, 6, 13, 14, 16, 18	Bassariscus astutus	
Raccoon	Most SHS's	Procyon lotor	V
Coati	4, 14, 16, 18	Nasua nasua	
Long-tailed Weasel	1, 4, 5, 14-16, 18, 20	Mustela frenata	V
Badger	1, 4, 5, 7, 9-13, 15	Taxidea taxus	V
Western Spotted Skunk	Most SHS's	Spilogale gracilis	
Striped Skunk	All SHS's	Mephitis mephitis	V
Hooded Skunk	Most SHS's	M. macroura	
Hog-nosed Skunk	Most SHS's	Conepatus mesoleucus	V
Mountain Lion	4, 6, 13-16, 18, 20	Felis concolor	V
Bobcat	All SHS's	Lynx rufus	V
Javelina	4-6, 15, 16, 18	Dicotyles tajacu	V
Elk	14, 20	Cervus elaphus	V
Mule Deer	All SHS's	Odocoileus hemionus	V
White-tailed Deer	4, 13, 14, 18, 20	O. virginianus	V
Pronghorn	5, 11, 12	Antilocapra americana	V
Desert Bighorn Sheep	4, 14	Ovis canadensis mexicanus	
Iranian Ibex	4, 14	Capra ibex	V

APPENDIX D-3 (continued)

WILDLIFE SPECIES LIST FOR LAS CRUCES/LORDSBURG RESOURCE AREA*

REPTILES AND AMPHIBIANS

Tiger Salamander	16	*Ambystoma tigrinum*	V
Plains Spadefoot Toad	1, 7, 9, 10, 12, 15	*Scaphiopus bombifrons*	V
Western Spadefoot Toad	1, 7, 9, 10, 12, 15	*S. hammondi*	
Couch's Spadefoot Toad	1, 7, 9-12, 15	*S. couchi*	V
Great Plains Toad	1, 5, 7, 9, 10, 12, 15, 16	*Bufo cognatus*	V
Colorado River Toad	5, 15, 16, 18	*B. alvarius*	V
Woodhouse's Toad	1, 4, 5, 7, 9-12, 15, 16	*B. woodhousei*	
Southwestern Toad	15, 16, 18	*B. microscaphus*	
Red-spotted Toad	4, 6, 14-16, 18	*B. punctatus*	V
Green Toad	1, 5, 7, 9, 10-12, 15, 16	*B. debilis*	V
Canyon Treefrog	4, 14, 16, 18	*Hyla arenicolor*	V
Bullfrog	4, 9, 14-16	*Rana catesbeiana*	V
Northern Leopard Frog	4, 14-16	*R. pipiens*	V
Western Box Turtle	1, 5-7, 9-12, 15	*Terrapene ornata*	V
Yellow Mud Turtle	7, 9-12	*Kinosternon flavescens*	V
Sonoran Mud Turtle	4, 14, 16	*K. sonoriense*	
Banded Gecko	1, 4-6, 13-16, 18	*Coleonyx variegatus*	V
Lesser Earless Lizard	1, 4-7, 9, 10, 13-16	*Holbrookia maculata*	V
Greater Earless Lizard	Most SHS's	*Cophosaurus texanus*	V
Zebra-tailed Lizard	1, 5, 6, 9	*Callisaurus draconoides*	V
Collared Lizard	Most SHS's	*Crotaphytus collaris*	V
Leopard Lizard	5, 7, 9, 10, 12, 14	*Gambelia wislizenii*	V
Bunch Grass Lizard	13	*Sceloporus scalaris*	
Yarrow's Spiny Lizard	4	*S. jarrovi*	V
Crevice Spiny Lizard	4, 6, 13, 14, 18	*S. poinsetti*	
Desert Spiny Lizard	5, 6, 9, 15, 16	*S. magister*	
Clark's Spiny Lizard	4, 16, 13, 14, 18	*S. clarki*	V
Eastern Fence Lizard	Most SHS's	*S. undulatus*	V
Striped Plateau Lizard	4, 16	*S. virgatus*	
Side-blotched Lizard	All SHS's	*Uta stansburiana*	V
Tree Lizard	4-6, 9, 10, 13-16, 18, 20	*Urosaurus ornatus*	V
Texas Horned Lizard	1, 4-7, 9-13, 15	*Phrynosoma cornutum*	V
Short-horned Lizard	4, 13, 14, 20	*P. douglassi*	V
Round-tailed Horned Lizard	1, 5, 7, 9, 10, 12, 15	*P. modestum*	V
Great Plains Skink	1, 4, 13, 14, 16, 18	*Eumeces obsoletus*	V
Many-lined Skink	4, 14, 20	*E. multivirgatus*	H
Mountain Skink	4, 16	*E. callicephalus*	V
Giant Spotted Whiptail	1, 4, 6	*Cnemidophorus burti*	
New Mexican Whiptail	5, 7, 9, 12, 15, 16	*C. neomexicanus*	V
Little Striped Whiptail	1, 4-6, 11, 12, 16	*C. inoratus*	V
Desert-grassland Whiptail	1, 5-7, 9-12, 16	*C. uniparens*	V
Chihuahuan Spotted Whiptail	1, 4, 6, 13, 14, 16, 18	*C. exsanguis*	V
Western Whiptail	1, 4-7, 9, 10, 14, 15	*C. tigris*	V
Checkered Whiptail	1, 4, 7, 9, 10, 15	*C. tesselatus*	V
Dixon's Whiptail	1, 5, 6	*C. dixoni*	
Gila Whiptail	4, 13, 14, 18	*C. flagellicaudus*	V
Plateau Striped Whiptail	14	*C. velox*	H
Arizona Alligator Lizard	14, 20	*Gerrhonotus kingi*	
Gila Monster	1, 4, 6, 16, 18	*Heloderma suspectum*	V
Western Blind Snake	5, 6, 12, 13, 15	*Leptotyphlops humilis*	
Texas Blind Snake	6, 12-15	*L. dulcis*	
Ringneck Snake	4, 13, 14, 18	*Diadophis punctatus*	
Western Hognose Snake	1, 7, 12	*Heterodon nasicus*	V
Coachwhip	1, 5, 7, 9-12, 16	*Masticophis flagellum*	V
Striped Whipsnake	4, 6, 9, 10, 12, 13, 16, 18	*M. taeniatus*	V
Sonora Whipsnake	4, 6, 13, 14	*M. bilineatus*	V
Big Bend Patch-nosed Snake	1, 5, 7, 9, 10, 12, 15	*Salvadora deserticola*	V
Mountain Patch-nosed Snake	4, 6, 12-14, 18	*S. grahamiae*	
Glossy Snake	1, 5, 7, 9-13, 18	*Arizona elegans*	V
Gopher Snake	Most SHS's	*Pituophis melanoleucus*	V
Common Kingsnake	1-5-7, 9-12, 15, 16	*Lampropeltis getulus*	V
Sonora Mountain Kingsnake	4, 16, 18	*L. pyromelana*	
Long-nosed Snake	1, 5, 7, 9-12, 15	*Rhinocheilus lecontei*	V
Narrow-headed Garter Snake	4, 14, 16	*Thamnophis rufipunctatus*	
Checkered Garter Snake	1, 5, 7, 9, 10, 12, 15	*T. marcianus*	
Mexican Garter Snake	4, 6, 13, 14, 18	*T. eques*	
Black-necked Garter Snake	4-6, 13-16, 18	*T. cyrtopsis*	V
Western Terrestrial Garter Snake	4, 11, 12, 16	*T. elegans*	
Western Ground Snake	9, 10, 15	*Sonora semiannulata*	
Western Hook-nosed Snake	4, 13, 14	*Gyalopion canum*	
Mexican Black-headed Snake	4, 6, 12-14, 16, 18	*Tantilla atriceps*	
Plains Black-headed Snake	1, 5-7, 9-12, 15	*T. planiceps*	V
Night Snake	Most SHS's	*Hypsiglena torquata*	
Arizona Coral Snake	6, 15, 16, 18	*Micruroides euryxanthus*	
Lyre Snake	1, 5, 6, 12, 13, 18	*Trimorphodon biscutatus*	
Black-tailed Rattlesnake	4, 6, 13, 14, 15, 16, 18	*Crotalus molossus*	V
Rock Rattlesnake	4, 6, 13, 14, 18, 20	*C. lepidus*	V
Western Prairie Rattlesnake	1, 7, 9, 10, 11, 12, 15	*C. viridis viridis*	V
Western Diamondback Rattlesnake	1, 4-7, 9-12, 15, 16	*C. atrox*	V
Mojave Rattlesnake	5, 6	*C. scutellatus*	V
Massasauga	11, 16	*Sistrurus catenatus*	
Arizona Black Rattlesnake	4	*C. viridis cerberus*	H

APPENDIX D-3 (concluded)

WILDLIFE SPECIES LIST FOR LAS CRUCES/LORDSBURG RESOURCE AREA*

FISH SPECIES

Gila Sucker	*Catostomus insignis*
Gila Mountain Sucker	*Pantosteus clarki*
Loach minnow	*Tiaroga cobitis*
Spikedace	*Meda fulgida*
Longfin Dace	*Agosia chrysogaster*
Mosquitofish	*Gambusia affinis*
Green Sunfish	*Lepomis cyanellus*
Roundtail Chub	*Gila robusta*
Rainbow Trout	*Salmo gairdneri*
Red Shiner	*Notropis lutrensis*
Channel Catfish	*Ictalurus punctatus*
Flathead Catfish	*Pylodictis olivaris*

APPENDIX E
MINERAL RESOURCES

APPENDIX E-1

STIPULATIONS FOR AREAS OF CONCERN

Stipulations are shown in Table E-1 according to the type of stipulation proposed under each alternative.

KEY:

Stipulations attached to all leases are:

	Surface Disturbance Stipulations
NM-2	Endangered Species, Cultural, and Paleontological Resources Stipulations (Oil and Gas)

Special Stipulations that may be attached are:

NM-3	Special Stipulation Concerning Steep Slopes, Watershed Damage, Painting, and Live Water (Oil and Gas) - New Mexico 3
NM-4	Stipulations for Leases Subject to a Highway Material Site Right-of-Way - New Mexico 4
NM-5	White Sand Evacuation Area - New Mexico 5
NM-7	Wilderness Protection Stipulation (WPS)
LC-2	Ecological Plots (NSO) - Las Cruces 2
LC-5	Cultural Resources - Las Cruces 5
LC-6	Cultural Resources - Las Cruces 6
LC-9	Recreation and Public Purposes - Las Cruces 9
LC-10	Communication and Radio Facilities - Las Cruces 10
LC-11	Aden Lava Flow RNA - Las Cruces 11
LC-12	New Mexico State College Ranch - Las Cruces 12
LC-13	Organ Mountains Recreation Lands (Not Open to Leasing) - Las Cruces 13
LC-14	Threatened or Endangered Species Stipulations - Las Cruces 14
LC-15	West Potrillo Mountains No Lease Area - Las Cruces 15
LC-16	No Surface Occupancy - Las Cruces 16
LC-17	Wildlife Surface Restrictions - Las Cruces 17
LC-18	Multi-Resources Seasonal - Las Cruces 18
LC-19	Cultural Resources - Las Cruces 19
LC-20	Special Values - Las Cruces 20

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SURFACE DISTURBANCE STIPULATIONS
OIL AND GAS LEASE

Area Oil and Gas Supervisor
(Address)

Management Agency *(name and address)*

---

1. Notwithstanding any provision of this lease to the contrary, any drilling, construction, or other operation on the leased lands that will disturb the surface thereof or otherwise affect the environment, hereinafter called "surface disturbing operation," conducted by lessee shall be subject, as set forth in this stipulation, to prior approval of such operation by the Area Oil and Gas Supervisor in consultation with appropriate surface management agency and to such reasonable conditions, not inconsistent with the purposes for which this lease is issued, as the Supervisor may require to protect the surface of the leased lands and the environment.

2. Prior to entry upon the land or the disturbance of the surface thereof for drilling or other purposes, lessee shall submit for approval two (2) copies of a map and explanation of the nature of the anticipated activity and surface disturbance to the Area Oil and Gas Supervisor and will also furnish the appropriate surface management agency named above, with a copy of such map and explanation. An environmental analysis will be made by the Geological Survey in consultation with the appropriate surface management agency for the purpose of assuring proper protection of the surface, the natural resources, the environment, existing improvements, and for assuring timely reclamation of disturbed lands.

3. Upon completion of said environmental analysis, the Area Oil and Gas Supervisor shall notify lessee of the conditions, if any, to which the proposed surface disturbing operations will be subject.

Said conditions may relate to any of the following:

(a) Location of drilling or other exploratory or developmental operations or the manner in which they are to be conducted;

(b) Types of vehicles that may be used and areas in which they may be used; and

(c) Manner or location in which improvements such as roads, buildings, pipelines, or other improvements are to be constructed.

Form 3109–5 (May 1973)

ENDANGERED SPECIES, CULTURAL, AND PALEONTOLOGICAL RESOURCES STIPULATIONS (OIL AND GAS)

I. Protection of Endangered or Threatened Species.

The Federal surface management agency is responsible for assuring that the area to be disturbed is examined, prior to undertaking any surface-disturbing activities on lands covered by this lease, to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. If the findings of this examination determine that the operation may detrimentally affect an endangered or threatened species, some restrictions to the operator's plans or even disallowances of use may result.

The lessee/operator may, at his discretion and cost, conduct the examination on the lands to be disturbed. This examination must be done by or under the supervision of a qualified resource specialist approved by the surface management agency. An acceptable report must be provided to the surface management agency identifying the anticipated effects of the proposed action on endangered or threatened species or their habitat.

II. Protection of Cultural and Paleontological Resources

A. The Federal surface management agency is responsible for determining the presence of cultural resources and specifying mitigation measures required to protect them. Prior to undertaking any surface-disturbing activity on the lands covered by this lease, the lessee/operator, unless notified to the contrary by the authorized officer of the surface management agency, shall:

1. Engage the services of a qualified cultural resource specialist acceptable to the surface management agency to conduct an intensive inventory for evidence of cultural resource values;

2. Submit a report acceptable to the authorized officer of the surface management agency and the District Oil and Gas Supervisor of the Minerals Management Service; and

3. Implement such mitigation measures as required by the authorized officer of the surface management agency to preserve or avoid destruction of inventoried cultural resource values. Mitigation may include relocation of proposed facilities, testing and salvage or other protective measures deemed necessary. All costs of the inventory and mitigation shall be borne by the lessee/operator and all data and materials salvaged shall remain under the jurisdiction of the U.S. Government.

B. The lessee/operator shall immediately bring to the attention of the District Oil and Gas Supervisor of the Minerals Management Service and the authorized officer of the surface management agency any cultural resources, paleontological, and other objects of scientific interest discovered as a result of surface operations under this lease and shall leave such discoveries intact until directed to proceed by the District Oil and Gas Supervisor.

SPECIAL STIPULATIONS CONCERNING STEEP SLOPES, WATERSHED DAMAGE, PAINTING, AND LIVE WATER (OIL AND GAS)

No surface disturbance will be allowed on slopes in excess of 30 percent without written permission from the District Oil and Gas Supervisor, Minerals Management Service, with the concurrence of the authorized officer of the Federal surface managment agency.

In order to minimize watershed damage, during muddy and/or wet periods, the authorized officer of the Federal surface management agency, through the District Oil and Gas Supervisor, Minerals Management Service, may prohibit exploration, drilling or other development. This limitation does not apply to maintenance and operation of producing wells.

To maintain esthetic values, all semi-permanent and permanent facilities may require painting or camouflage to blend with the natural surroundings. The paint selection or method of camouflage will be subject to the approval of the District Oil and Gas Supervisor, with the concurrence of the authorized officer of the Federal surface management agency.

Drilling or storage facilities may be prohibited within 300 feet of any live water, reservoir, river or major drainage channel and any operation within floodplains will be strictly controlled to prevent contamination. The 300-foot distance may be modified by the Oil and Gas Supervisor of the Minerals Management Service with the concurrence of the authorized officer of the Federal surface management agency.

NM-3

STIPULATION FOR LEASES SUBJECT TO A HIGHWAY MATERIAL SITE RIGHT-OF-WAY

The lessee/operator shall conduct operations in conformity with the following requirements:

1. The New Mexico State Highway Department will have unrestricted rights of ingress and egress to the right-of-way.

2. The lessee/operator will not conflict with the right of the New Mexico State Highway Department to remove any road-building materials from the right-of-way.

3. The New Mexico State Highway Department reserves the right to set up, operate, and maintain such facilities as are reasonable to expedite the removal, production, and use of the materials; and the lessee shall not interfere with the Highway Department's use of the property for such purposes.

4. The lessee/operator will make no excavation and erect no structures on the right-of-way that might be adverse to the use and interest of the land by the New Mexico State Highway Department.

NM-4

WHITE SANDS EVACUATION AREA

All or portions of the lands contained in this lease are located within the White Sands Missile Range Safety Evacuation Area and shall be evacuated on those days that missiles are to be fired. Prior to beginning exploration activities, the lessee shall contact the Corps of Engineers in Albuquerque and the Master Planning Branch at White Sands Missile Range in order to be advised of the terms of the safety evacuation agreement and missile firing schedules.

NM-5

WILDERNESS PROTECTION STIPULATION

By accepting this lease, the lessee acknowledges that the lands contained in this lease are being inventoried or evaluated for their wilderness potential by the Bureau of Land Management (BLM) under section 603 of the Federal Land Policy and Management Act of 1976, 90 Stat. 2743 (43 USC Sec. 1782), and that exploration or production activities which are not in conformity with Section 603 may never be permitted. Expenditures in leases on which exploration drilling or production are not allowed will create no additional rights in the lease, and such leases will expire in accordance with law.

Activities will be permitted under the lease so long as BLM determines they will not impair wilderness suitability. This will be the case either until the BLM wilderness inventory process has resulted in a final wilderness inventory decision that an area lacks wilderness characteristics, or in the case of a wilderness study area until Congress has decided not to designate the lands included within this lease as wilderness. Activities will be considered nonimpairing if the BLM determines that they meet each of the following three criteria:

(a) It is temporary. This means that the use or activity may continue until the time when it must be terminated in order to meet the reclamation requirement of paragraphs (b) and (c) below. A temporary use that creates no new surface disturbance may continue unless Congress designates the area as wilderness, so long as it can easily and immediately be terminated at that time, if necessary to management of the area as wilderness.

(b) Any temporary impacts caused by the activity must, at a minimum, be capable of being reclaimed to a condition of being substantially unnoticeable in the wilderness study area (or inventory unit) as a whole by the time the Secretary of the Interior is scheduled to send his recommendations on that area to the President, and the operator will be required to reclaim the impacts to that standard by that date. If the wilderness study is postponed, the reclamation deadline will be extended accordingly. If the wilderness study is accelerated, the reclamation deadline will not be changed. A full schedule of wilderness studies will be developed by the Department upon completion of the intensive wilderness inventory. In the meantime, in areas not yet scheduled for wilderness study, the reclamation will be scheduled for completion within 4 years after approval of the activity. (Obviously, if and when the Interim Management Policy ceases to apply to an inventory unit dropped from wilderness review following a final wilderness inventory decision of the BLM State Director, the reclamation deadline previously specified will cease to apply.) The Secretary's schedule for transmitting his recommendations to the President will not be changed as a result of any unexpected inability to complete the reclamation by the specified date, and such inability will not constrain the Secretary's recommendation with respect to the area's suitability or nonsuitability for preservation as wilderness.

The reclamation will, to the extent practicable, be done while the activity is in progress. Reclamation will include the complete recontouring of all cuts and fills to blend with the natural topography, the replacement of topsoil, and the restoration of plant cover at least to the point where natural succession is occurring. Plant cover will be restored by means of reseeding or replanting, using species previously occurring in the area. If necessary, irrigation will be required. The reclamation schedule will be based on conservative assumptions with regard to growing conditions, so as to ensure that the reclamation will be complete, and the impacts will be substantially unnoticeable in the area as a whole, by the time the Secretary is scheduled to send his recommendations to the President. ("Substantially unnoticeable" is defined in Appendix F of the Interim Management Policy and Guidelines for Lands under Wilderness Review.)

(c) When the activity is terminated, and after any needed reclamation is complete, the area's wilderness values must not have been degraded so far, compared with the area's values for other purposes, as to significantly constrain the Secretary's recommendation with respect to the area's suitability or nonsuitability for preservation as wilderness. The wilderness values to be considered are those mentioned in section 2(c) of the Wilderness Act, including naturalness, outstanding opportunities for solitude or for primitive and unconfined recreation, and ecological, geophysical or other features of scientific, educational, scenic, or historical value.

If all or any part of the area included within the leasehold estate is formally designated by Congress as wilderness, exploration and development operations taking place or to take place on that part of the lease will remain subject to the requirements of this stipulation, except as modified by the Act of Congress designating the land as wilderness. If Congress does not specify in such act how existing leases like this one will be managed, then the provisions of the Wilderness Act of 1964 will apply, as implemented by rules and regulations promulgated by the Department of the Interior.

Lands within leased area to which this stipulation applies are described as follows:

Signature of Lessee

ECOLOGICAL PLOTS

No occupancy or other activity on the surface of the following described lands is allowed in order to protect their value as ecological study plots and demonstration areas:

Signature of Lessee

LC-2

CULTURAL RESOURCES

No occupancy or other activity on the surface of the following described lands is allowed in order to protect sites listed on the State Register of Historic Places and sites nominated to the National Register of Historic Places:

Signature of Lessee

LC-5

CULTURAL RESOURCES

No drilling or storage facilities will be allowed within 500 feet of sites on the leased lands which are listed on the State Register of Historic Places and sites proposed for nomination to the National Register of Historic Places. This distance may be modified when specifically approved in writing by the authorized officer of the Minerals Management Service, with the concurrence of the authorized officer of the Bureau of Land Management, and the State Historic Preservation Officer.

Signature of Lessee

LC-6

RECREATION AND PUBLIC PURPOSES

The lessee is given notice that all or part of the lease area contains special values, are needed for special purposes or requires special attention to prevent damage to surface resources. Any surface use or occupancy within such areas is strictly prohibited unless the lessee/operator demonstrates that the area is essential to adequately explore for or develop oil or gas, the lessee/operator submits a surface use and operations plan, and the surface management agency finds the proposed surface occupancy or use does not compromise the decision upon which the restriction is based or adversely affect the resources protected by the restriction.

Reason for Restriction:

To protect recreation and public purposes facilities authorized under the Recreation and Public Purposes Act.

Duration of Restriction: Year-round

Prior to acceptance of this stipulation the prospective lessee is encouraged to contact the Federal surface management agency for further information regarding the restrictive nature of this stipulation.

Signature of Lessee

LC-9

COMMUNICATION AND RADIO FACILITIES

No occupancy or other activity on the surface of the following described lands is allowed in order to protect communication and radio facilities:

Signature of Lessee

LC-10

ADEN LAVA FLOW RNA

The lessee is given notice that all or part of the lease area contains special values, are needed for special purposes or requires special attention to prevent damage to surface resources. Any surface use or occupancy within such areas is strictly prohibited unless the lessee/operator demonstrates that the area is essential to adequately explore for or develop oil or gas, the lessee/operator submits a surface use and operations plan, and the surface management agency finds the proposed surface occupancy or use does not compromise the decision upon which the restriction is based or adversely affect the resources protected by the restriction.

Reason for Restriction:

To protect the Aden Lava Flow Research Natural Area

Duration of Restriction: Year-round

Prior to acceptance of this stipulation the prospective lessee is encouraged to contact the Federal surface management agency for further information regarding the restrictive nature of this stipulation.

____
Signature of Lessee

LC-11

NEW MEXICO STATE COLLEGE RANCH

The lessee is given notice that all or part of the lease area contains special values, are needed for special purposes or requires special attention to prevent damage to surface resources. Any surface use or occupancy within such areas is strictly prohibited unless the lessee/operator demonstrates that the area is essential to adequately explore for or develop oil or gas, the lessee/operator submits a surface use and operations plan, and the surface management agency finds the proposed surface occupancy or use does not compromise the decision upon which the restriction is based or adversely affect the resources protected by the restriction.

Reason for Restriction:

To protect areas on the New Mexico State College Ranch which are used for grazing experiments and research.

Duration of Restriction: Year-round

Prior to acceptance of this stipulation the prospective lessee is encouraged to contact the Federal surface management agency for further information regarding the restrictive nature of this stipulation.

____
Signature of Lessee

LC-12

ORGAN MOUNTAINS RECREATION LANDS
NO LEASING AREA

The Organ Mountains MFP completed in November 1974 contains a decision not to allow mineral leasing on the Organ Mountains Recreation Lands. These lands were designated as a Class II General Outdoor Recreation Area on May 28, 1971 by notice in the Federal Register. This action was taken pursuant to 43 CFR Subpart 2070. The area contains scenic and environmental values unique to the region. Specifically, the area includes a variety of endangered, threatened or uncommon plant and animal species. The area is also designated by the New Mexico Department of Game and Fish as a game refuge. Hunting and use of firearms are strictly controlled through special entry permits to protect wildlife values. The Aguirre Spring Campground, the scenic beauty of the mountain range, and two hiking trails make this area a favorite for weekend and evening use by many visitors in the region (approximate population within a 50-mile radius is a million people). Off-road vehicle use has been restricted beyond the campground and trails to manage visitor use. Mineral leasing of the Organ Mountains Recreation Lands would not be consistent with protection of the values that exist and the objectives for management of the area.

LC-13

THREATENED OR ENDANGERED SPECIES STIPULATIONS

The lessee is given notice that all or part of the lease area contains special values, are needed for special purposes or requires special attention to prevent damage to surface resources. Any surface use or occupancy within such areas is strictly prohibited unless the lessee/operator demonstrates that the area is essential to adequately explore for or develop oil or gas, the lessee/operator submits a surface use and operations plan, and the surface management agency finds the proposed surface occupancy or use does not compromise the decision upon which the restriction is based or adversely affect the resources protected by the restriction.

Reason for Restriction:

To protect threatened and endangered species habitat.

Duration of Restriction: Year-round

Prior to acceptance of this stipulation the prospective lessee is encouraged to contact the Federal surface management agency for further information regarding the restrictive nature of this stipulation.

____
Signature of Lessee

LC-14

WEST POTRILLO MOUNTAINS
NO LEASE AREA

As a result of decisions in the Las Uvas MFP in June 1976, this area is not open to leasing to protect back country, primitive, and wildlife values. The unit resource analysis and field observations identified relic plant communities which are unique to this region. Decisions were also made to do no land treatments (chemical or mechanical manipulation of the plants) to alter the natural character of the area. This MFP also contains a decision to close the area to off-road vehicle use as well as a decision to determine the area's suitability for release of pronghorn antelope. Because of an almost nonexistent surface water supply and the relative inaccessibility of the area, a series of unique natural systems exist in a relatively pristine condition. The area offers an unusual opportunity to observe and appreciate these systems functioning in an almost undisturbed state. The planning process, including considerable public involvement, determined that development of this area would be detrimental to these values.

LC-15

NO SURFACE OCCUPANCY

No Occupancy or Other Activity on the surface of ______________________ is allowed under this lease.

Reason for restriction are:

LC-16

WILDLIFE SURFACE RESTRICTIONS

No __________________ will be allowed within _____ feet of the __________________. This area contains ______ acres and is described as follows:

Reasons:

First blank to be filled in with one or more of the following: drilling, storage facilities, surface disturbance or occupancy. Second and third blanks to be filled in with one or more of the following:

1. _____ feet wildlife habitat essential to specific species
2. _____ feet peripheral or unique vegetative type
3. 200 feet either side of centerline of roads or highways
4. 500 feet of normal high water line on all streams, rivers, ponds, reservoirs, lakes
5. 600 feet of all springs
6. 400 feet of any improvements

Note: Stipulation No. 12 could be used in place of Stipulation Nos. 4 and 5.

LC-17

MULTI-RESOURCES SEASONAL

In order to protect (Raptors) Seasonal Wildlife Habitat, Surface disturbing activities will be allowed only during August 1 through January 31. This does not apply to maintenance and operation of producing wells and facilities. Lands within leased area to which this stipulation applies are described as follows:

Reasons: To protect raptor nesting

First blank to be filled in with one or more of the following:

1. Watershed damage
2. Soil erosion
3. Seasonal wildlife habitat (winter range, calving/lambing area, etc.)
4. Conflicts with recreation

Second blank to be filled in with one or more of the following:

1. Surface disturbing activities
2. Exploration
3. Drilling
4. Development

Third blank to be filled in with one or more of the following:

1. Period from August 1 to January 31.
2. Dry soil periods
3. Over the snow
4. Frozen ground

LC-18

CULTURAL RESOURCES

Vehicular use on all or portions of the lands contained in this lease is limited to existing roads and trails in order to prevent damage to cultural resources. Exceptions may be granted when the lessee/ operator submits a surface use and operations plan which is satisfactory to the authorized officer of the Minerals Management Service and the Authorized Officer, Bureau of Land Management, for the protection of cultural resources.

____
Signature of Lessee

LC-19

SPECIAL VALUES

The lessee is given notice that all or part of the lease area contains special values, are needed for special purposes or requires special attention to prevent damage to surface resources. Any surface use or occupancy within such areas is strictly prohibited unless the lessee/operator demonstrates that the area is essential to adequately explore for or develop oil or gas, the lessee/operator submits a surface use and operations plan, and the surface management agency finds the proposed surface occupancy or use does not compromise the decision upon which the restriction is based or adversely affect the resources protected by the restriction.

Reason for Restriction:

Duration of Restriction: Year-round

Prior to acceptance of this stipulation the prospective lessee is encouraged to contact the Federal surface management agency for further information regarding the restrictive nature of this stipulation.

____
Signature of Lessee

LC-20

APPENDIX E-1

AREAS OF CONCERN AND PROPOSED STIPULATIONS

Name	Proposed Action	No Action	Maximization of Energy Minerals Leasing	Enhancement of Other Resource Values	Resource Protected
Wilderness Study Areas (WSAs)					
Aden Lava Flow	NM 7	NM 7	Open	NM 7	Wilderness Values
Alamo Hueco Mountains	NM 7	NM 7	Open	NM 7	Wilderness Values
Big Hatchet Mountains	NM 7	NM 7	Open	NM 7	Wilderness Values
Blue Creek	NM 7	NM 7	Open	NM 7	Wilderness Values
Cedar Mountains	NM 7	NM 7	Open	NM 7	Wilderness Values
Cooke's Range	NM 7	NM 7	Open	NM 7	Wilderness Values
Cowboy Spring	NM 7	NM 7	Open	NM 7	Wilderness Values
Gila Lower Box	NM 7	NM 7	Open	NM 7	Wilderness Values
Las Uvas Mountains	NM 7	NM 7	Open	NM 7	Wilderness Values
Organ Mountains	NM 7	NM 7	Open	NM 7	Wilderness Values
Robledo Mountains	NM 7	NM 7	Open	NM 7	Wilderness Values
West Potrillo Mountains and Mount Riley	NM 7	NM 7	Open	NM 7	Wilderness Values
Guadalupe Canyon ISA	NM 7	NM 7	Open	NM 7	Wilderness Values
Non-WSAs Under Appeal					
Redrock	NM 7	NM 7	Open	NM 7	Wilderness Values
Florida Mountains	NM 7	NM 7	Open	NM 7	Wilderness Values
Cooke's Range (2 pieces)	NM 7	NM 7	Open	NM 7	Wilderness Values
Cedar Mountains (3 pieces)	NM 7	NM 7	Open	NM 7	Wilderness Values
Arizona WSAs in the Resource Area					
Peloncillo Mountains (Doubtful Canyon)	NM 7	NM 7	Open	NM 7	Wilderness Values
Apache Box	NM 7	NM 7	Open	NM 7	Wilderness Values
Hoverrocker	NM 7	NM 7	Open	NM 7	Wilderness Values
Ecological Plots					
Bertoglio/Merrill	LC 20	LC 2	Open	LC 2	Research
Culberson	LC 20	LC 2	Open	LC 2	Research
Diamond	LC 20	LC 2	Open	LC 2	Research
Rodrick	LC 20	LC 2	Open	LC 2	Research
Special Designation Areas					
Aden Lava Flow RNA	LC 16	LC 11	Open	NOL	Special Values
Baylor Recreation Area	NOL	NOL	Open	NOL	Recreation
Central Peloncillo RNA/ACEC	LC 16	LC 14	Open	LC 16	Research
Dona Ana Recreation Area	LC 20	NOL	Open	NOL	Recreation
Gila River Lower Box Riparian ACEC (Proposed)	LC 16	a/	Open	LC 16	Multi-Resources
Gila River Middle Box Wildlife ACEC (Proposed)	LC 16	a/	Open	LC 16	Multi-Resources
Granite Gap Recreation Area	a/	NOL	Open	a/	Recreation/T or E
Guadalupe Canyon ONA	LC 16	NOL	Open	LC 16	Wildlife ONA
Kilbourne Hole NNL	LC 16	Open	Open	LC 16	Cultural Resources
Needles Eye Picnic Site	LC 16	NOL	Open	LC 16	Recreation
Organ Mountain Scenic ACEC (Proposed)	LC 16	a/	Open	LC 16	Recreation
C&MU lands within ACEC	NOL	a/	Open	NOL	Recreation
Subsurface Only	LC 16	a/	Open	LC 16	Recreation
Organ Mountain Recreation Area	NOL	NOL	Open	NOL	Recreation
Organ Mountain Recreation Lands	LC 20	LC 13	Open	LC 16	Recreation
West Potrillo Primitive Area	LC 20	LC 15	Open	a/	Wilderness Values
Recreation and Public Purposes (R&PPs)					
Sanitary Landfills					
Anthony	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Butterfield	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Chaparral	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Garfield	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Hatch	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Hill	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
La Mesa	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
La Union	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Las Cruces (2 sites)	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Luna County	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Mesilla Dam	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Mesquite	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Rincon	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Salem	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Silver City	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Virden	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Cemetaries					
Dona Ana County Cemetary	LC 9	LC 9	Open	LC 16	Recreation & Public Purposes
Shakespeare Cemetary (Hidalgo)	LC 9	LC 9	Open	LC 16	Recreation & Public Purposes
Religious Sites					
Lords Ranch (Our Lady's Youth Center) (Dona Ana)	LC 9	LC 9	Open	LC 16	Recreation & Public Purposes
Tortugas Mountain (Dona Ana)	LC 9	Open	Open	LC 16	Recreation & Public Purposes

APPENDIX E-1 (concluded)

AREAS OF CONCERN AND PROPOSED STIPULATIONS

Name	Proposed Action	No Action	Maximization of Energy Minerals Leasing	Enhancement of Other Resource Values	Resource Protected
Recreation and Public Purposes (R&PPs) (cont.)					
Observatory Sites					
(NMSU) Astronomical Research (Dona Ana)	LC 9	LC 9	Open	LC 16	Research
(Northwestern University) Astronomical Research and Educational Purposes (Dona Ana)	LC 9	LC 9	Open	LC 16	Research
School Sites					
Gadsden Elementary	LC 9	Open	Open	LC 16	Recreation & Public Purposes
Gadsden High School (Proposed)	LC 9	Open	Open	LC 16	Recreation & Public Purposes
Recreational Use Areas					
Grant County--Scientific, Educational, and Recreational Use	LC 9	LC 9	Open	LC 16	Recreation & Public Purposes
Hidalgo County--Recreational Use	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Las Cruces Shooting Range	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Luna County--Public Recreation Area	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Spring Canyon (Luna)--Public Park and Recreation Area	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Village of Central (Luna)--Municipal Park and Roadside Rest Area	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
(Proposed) West Mesa Park (Dona Ana)	LC 9	Open	Open	LC 9	Recreation & Public Purposes
Miscellaneous					
Educational Television Site (Dona Ana)	LC 10	LC 10	Open	LC 16	Recreation & Public Purposes
Prison Site (Dona Ana)	LC 16	LC 9	Open	LC 16	Recreation & Public Purposes
Water Tanks-Silver City (Luna)	LC 16	LC 9	Open	LC 16	Recreation & Public Purposes
City Expansion (Las Cruces)	LC 9	LC 9	Open	LC 9	Recreation & Public Purposes
Airports					
Hatch	LC 16	LC 9	Open	LC 16	Recreation & Public Purposes
Las Cruces-Crawford	LC 16	LC 9	Open	LC 16	Recreation & Public Purposes
Southern Dona Ana Airport	LC 16	LC 9	Open	LC 16	Recreation & Public Purposes
Other Areas					
Alamo Hueco Mountains (Bighorn Habitat Area)	LC 14	LC 14	Open	LC 14	T or E Plants and Bighorn Sheep
Big Hatchet Mountains (Bighorn Habitat Area)	LC 14	LC 14	Open	LC 14	T or E Plants and Bighorn Sheep
Butterfield Trail (well preserved ruts) (Proposed)	Open	Open	Open	LC 19	Cultural Resources
Cooke's Range (Wildlife) (Proposed)	LC 18	a/	Open	LC 16	Raptor Nesting/Wildlife
Cowboy Spring (Bighorn Reintroduction Area) (Proposed)	LC 14	a/	Open	LC 16	Bighorn Sheep/Wildlife
Florida Mountains Raptor Nesting Area (Proposed)	LC 18	Open	Open	LC 16	Raptor Nesting/Wildlife
Fort Cummings	NOL	NOL	Open	NOL	Cultural Resources
Franklin Mountains (South) (Proposed)	LC 14	Open	Open	LC 16	T or E/Recreation
Franklin Mountains (North) (Proposed)	Open	Open	Open	LC 20	Recreation/T or E
Gila River--					
Gila River Riparian Areas (Proposed)	LC 14	a/	Open	LC 16	Riparian Habitat/Wildlife
Gila River Valley	a/	LC 14	Open	a/	Wildlife/Visual
Soils Area (Proposed)	a/	a/	Open	LC 16	Soils
Hadley Draw Riparian Area (Proposed)	LC 14	Open	Open	LC 16	Wildlife (Riparian)
Massacre Peak (Petroglyph Area)	NOL	NOL	Open	NOL	Cultural Resources
NMSU College Ranch	LC 12	LC 12	Open	LC 12	Range Experiments
Oldtown (Proposed)	LC 19	Open	Open	LC 16	Cultural Resources
Organ Mountains (Wildlife) (Proposed)	LC 18	a/	Open	LC 16	Raptor Nesting/Wildlife
Peloncillo Mountains (Wildlife Habitat Area) (Proposed)	LC 14	a/	Open	LC 14	T or E Plants and Bighorn Sheep
Peloncillo Mountains (Crucial Habitat Area) (Existing)	a/	LC 14	Open	a/	
Redrock Game Farm (Proposed)	LC 14	Open	Open	NOL	Wildlife/Riparian Habitat
San Simon Cienega	LC 14	LC 14	Open	LC 14	Wildlife/Riparian Habitat
San Simon Cienega Riparian Area (Proposed)	LC 14	a/	Open	LC 16	Wildlife/Riparian Habitat

Source: BLM Las Cruces District Office files, 1982.

Note: a/This area is covered in whole or in part within another area, with a stipulation to protect the same or similar values (see Overlays 2 and 3).

APPENDIX E-2

METHODOLOGY - ENERGY MINERALS ASSUMPTIONS

Energy minerals assumptions in the Las Cruces/Lordsburg Management Framework Plan Amendment/Environmental Impact Statement (MFP Amendment/EIS) were determined by using data from Las Cruces District methodology from the Buffalo Resource Area Oil and Gas Environmental Assessment, Casper, Wyoming (1980) and oil and gas leasing in Kingman Bighorn Sheep Habitat EA (1982). The Geothermal Handbook (1976) was used to project disturbances caused by geothermal activities.

The impacts of oil and gas operations were assessed by using past drilling activity data on public land. One producing well was assumed strictly for impact analysis in the area with the greatest energy minerals potential. Exploration seismic line data was extracted from district files and surface disturbance factors from the Buffalo EA and Bighorn Sheep Habitat EA (1982) were applied to them.

Geothermal resource assumptions were developed from the Geothermal Handbook and BLM Las Cruces District file data. The assumption was made to use one direct use geothermal greenhouse for analysis purposes only. The area selected was in the area with the best geothermal potential on public land.

Data used for projecting "wildcat" wells is as follows:

Year	Cummulative Number of Wells on All Lands within the Resource Area
1940	12
1960	28
1980	32

This information was plotted on a graph and projected to years 1994 and 2110 which are short-term and long-term, respectively. The number of wells derived from this graph was than applied to the surface disturbance factors as shown on Tables 1-3 and 1-4.

Data used for projecting geophysical exploration was derived from district files and also plotted on a graph to project the number of disturbed acres. Data is as follows:

Year	Cummulative Number of Notices of Intents (NOIs) on Public Lands within the Resource Area
1978	5
1979	12
1980	10
1981	20
1982	47+

The number of NOIs derived from this graph was then applied to the surface disturbance factors as shown on Table 1-3 and 1-4.

APPENDIX E-2 (concluded)

Data used for projecting geothermal activity was derived from district files and industry input. Geothermal development will in all likelihood take place on private land. The assumption based on the best geothermal potential area was for analysis purposes only.

The assumption was made that any geothermal development in the Lightening Dock Known Geothermal Resource Area (KGRA) would probably take place on private land due to the land ownership patterns.

The assumption was made that there would be no development in the Kilbourne Hole KGRA due to lack of industry interest and temperature data received from industry.

The assumption was made that geothermal development would probably take place on the East Mesa in Dona Ana County close to the urbanized area with proven geothermal potential.

The assumption was made that there would be a decline in shallow temperature holes in our existing KGRAs.

APPENDIX F
LIVESTOCK GRAZING

APPENDIX F-1

ACREAGE AND FORAGE ALLOCATION BY ALLOTMENT

Allotment Number	Allotment Name	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Present Allocations (AUMs)			5-Year Average Licensed Use	Proposed Forage Allocations (Federal AUMs)		Changes from Preference (AUMs)	Projected Goal by Year 2010 (AUMs)	
					Total AUMs (Private, State, Federal)	Big Game	Preference (Federal)		Livestock	Big Game		Livestock	Big Game
					Hidalgo County								
1001	C. Adams and Sons (Allen Foster)	6,690	2,406	9,096	900	0	456	459[a]	459	15	+3	911	22
1002	Animas (Houston Moore)	960	0	960	216	0	216	216	216	0	0	216	0
1003	J.W. Adams Estate	2,260	800	3,060	636	0	456	368	368	7	-88	368	10
1005	Bagwell Farms Inc.	400	780	1,180	240	12	60	60	60	0	0	120	0
1541	Bagwell Farms Inc.	320	0	320	60	0	60	60	60	0	0	0	0
*1006	Bertoglio-Merrill	20,627	5,540	26,167	4,332	72	3,336	3,041	3,041	13	-295	3,129	17
1008	G.W. Butler	5,412	4,123	9,535	2,232	0	1,152	1,066	1,066	24	-86	706	32
1009	Cienega Ranch (Gaby Hayes)	29,110	14,579	43,689	5,702	0	4,349	2,086	2,086	197	-2,263	3,899	251
1010	Steins Mountain (Lance Williams)	10,559	10,092	20,651	2,508	36	1,488	1,480	1,480	0	-8	1,480	0
1012	Frank T. Croom - North	8,545	808	9,353	1,384	12	1,132	814	814	9	-318	1,217	13
1013	Frank T. Croom - South	1,985	800	2,785	744	0	600	570	570	12	-30	542	17
1014	Lordsburg Mesa (Culberson Ranches)	36,851	52,559	89,410	14,400	0	5,736	5,760	5,760	11	+24	5,946	17
1015	James S. Cureton	7,560	11,976	19,536	3,912	84	1,416	1,411	1,411	0	-5	1,234	0
1016	J.R. and C. Donaldson	2,400	320	2,720	360	24	288	288	288	0	0	282	0
1017	Clinton E. Dunagan	2,892	4,667	7,559	1,935	10	528	532	532	27	+4	298	38
1505	Clinton E. Dunagan	510	0	510	192	0	192	192	192	0	0	0	0
1018	Edward Elbrock	2,990	900	3,890	900	0	684	663	663	0	-21	663	0
1019	Bessie A. Estes (Evans and Washburn)	3,756	1,960	5,716	996	1	588	589[a]	589	9	+1	681	11
1021	Lightning Dock (Alan S. Goodwin)	2,866	2,148	5,014	900	0	540	449	449	0	-91	449	0
1024	Rita and Janaloo Hill	6,580	2,901	9,481	1,044	0	684	463	463	0	-221	463	0
1025	Rainbow Wash (Andy Peterson)	6,142	4,674	10,816	1,608	0	840	670	670	3	-170	903	4
1026	Gold Hill Canyon (W.D. Ranch Inc.)	11,626	12,763	24,389	3,348	0	1,380	1,235	1,235	0	-145	2,374	0
1538	Holliday Logging Inc. (W.D. Ranch Inc.)	1,202	0	1,202	204	0	204	204	204	0	0	0	0
*1027	George R. Jackson, Jr.	5,513	2,650	8,163	1,536	24	972	841[d]	841	0	-131	548	0
1028	Robert Johns	2,644	60	2,704	288	0	288	307	307	0	+19	307	0
1029	Robert Johns	960	320	1,280	288	0	192	162	162	0	-30	162	0
1030	Alfred Johnson	9,058	2,738	11,796	1,740	24	1,152	1,134	1,134	23	-18	1,370	32
1031	Muriel F. Johnson	320	0	320	60	0	60	60	60	0	0	60	0
1032	Fred Kerr, Sr. - East	6,768	6,013	12,781	1,776	0	624	230	230	0	-394	629	0
1545	Fred Kerr, Sr.	80	0	80	24	0	24	24	24	0	0	0	0
1033	Karry K. Klump	3,333	0	3,333	660	12	660	540	540	0	-120	540	0
1034	Ted and Mona Larson	17,714	29,490	47,204	5,448	12	1,860	1,852	1,852	0	-8	1,047	0
1035	J.E. Little	2,460	80	2,540	132	0	120	80[a]	80	0	-40	80	0
1038	Murel G. and Myra Mahan	3,320	3,280	6,600	768	0	276	231[c]	231	0	-45	251	0
1551	Murel G. and Myra Mahan	440	0	440	24	0	24	20	20	0	-4	0	0
*1041	John T. Muir - West	34,042	16,127	50,169	7,404	0	4,944	4,709	4,709	63	-235	8,085	79
1042	Oma O. McCants - West (Alan Kerr)	4,761	1,570	6,331	300	0	192	43	43	0	-149	43	0
1043	Goat Canyon (Thomas McCants)	480	0	480	36	0	36	15[b]	15	0	-21	15	0
*1044	J.V. McCarty	9,519	1,854	11,373	1,416	0	1,212	806	806	30	-406	1,831	37
1048	Donald L. Frazier	11,143	1,920	13,063	2,160	48	1,740	1,092	1,092	50	-648	2,011	64
1050	Richard Searle	11,922	2,544	14,466	2,640	0	2,232	2,219	2,219	31	-13	2,370	34
1052	Antelope Pass - Adoline Hill	4,183	1,100	5,283	864	12	612	607	607	0	-5	607	18
1053	Edna S. Peterson (Andy Peterson)	3,286	1,427	4,713	677	0	473	330	330	0	-143	330	0
1055	R.M. Reynolds Estate	5,960	9,389	15,349	2,568	24	996	856	856	0	-140	914	0
1547	R.M. Reynolds Estate	40	0	40	12	0	12	12	12	0	0	0	0
1056	Richins Inc.	4,160	1,320	5,480	288	0	216	216[a]	216	0	0	216	0
1057	Swallow Fork Peak (Rouse Cattle Co.)	5,530	9,445	14,975	2,340	0	888	827	827	0	-61	917	0
1058	C.F. Sanford - North (Alfred Johnson)	1,720	140	1,860	204	0	156	157	157	0	+1	181	0
1546	C.F. Sanford - North (Alfred Johnson)	145	0	145	24	0	24	24	24	0	0	0	0
1059	Robert Shay	35,591	12,011	47,602	8,904	48	6,240	5,849[a]	5,849	0	-391	5,348	0
1060	Andrew Monroe Smith	6,406	4,005	10,411	1,800	0	744	567	567	3	-177	785	3
1061	Steeple Rock (Randell Thygerson)	1,810	1,775	3,585	720	0	324	324	324	0	0	324	0
1062	Andy Peterson	11,710	6,688	18,398	2,904	0	1,824	1,162	1,162	0	-662	1,162	0
1063	Andy Peterson	7,605	1,920	9,525	1,498	24	1,210	877	877	0	-333	1,587	0
1064	Andy Peterson	400	0	400	84	0	84	84[a]	84	0	0	84	0
1065	George Wright Place (Harriet Green)	800	0	800	96	0	96	96	96	0	0	96	0
1066	Pacific Western (Victorio Co.)	4,200	0	4,200	1,056	0	1,056	1,056	1,056	171	0	2,303	240
1068	J.R. Walter	11,738	3,868	15,606	888	0	528	479	479	0	-49	479	0
1069	R.H. Wamel et al	9,835	13,160	22,995	3,084	0	1,104	424	424	0	-680	803	0
1554	R.H. Wamel et al	1,400	0	1,400	312	0	312	278	278	0	-34	0	0

APPENDIX F-1 (continued)

Allotment Number	Allotment Name	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Present Allocations (AUMs)				Proposed Forage Allocations (Federal AUMs)		Changes from Preference (AUMs)	Projected Goal by Year 2010 (AUMs)	
					Total AUMs (Private, State, Federal)	Big Game	Preference (Federal)	5-Year Average Licensed Use	Livestock	Big Game		Livestock	Big Game
				Hidalgo County (continued)									
1070	Johnson and Evans	5,113	5,721	10,834	2,328	24	1,104	1,092	1,092	0	-12	955	0
1555	Johnson and Evans	40	0	40	12	0	12	12	12	0	0	0	0
1071	Weatherby Ranch	3,543	2,420	5,963	1,152	24	696	692	692	6	-4	920	7
1072	Gleason Family Trust	3,474	2,805	6,279	480	0	300	32	32	0	-268	32	0
1073	Herbert J. Young	11,624	23,588	35,212	7,320	24	2,760	2,511[c]	2,511	373	-249	2,596	506
1074	Jerry Veck	1,015	720	1,735	336	0	216	118[a]	118	0	-98	137	0
1537	Jerry Veck	160	0	160	24	0	24	19[b]	19	0	-5	0	0
1076	Robert Johns	2,150	1,280	3,430	480	0	288	223	223	0	-65	293	0
1077	John T. Muir (South)	578	0	578	108	0	108	108	108	0	0	108	0
1078	Caprock (Pat and Mike Laney)	30,028	7,439	37,467	6,132	0	4,884	4,844	4,844	0	-40	6,087	0
1079	Fred Kerr, Sr. - West	1,483	1,600	3,083	504	0	180	95	95	0	-85	95	0
1080	Young Place (Victorio Co.)	60	0	60	12	0	12	11	11	0	-1	11	0
2016	Mountain Ranch (Richard Faulkner)	6,560	640	7,200	1,368	0	1,248	566	566	0	-682	566	0
2022	U-Bar Ranch (Pacific Western)	39,006	92,162	131,168	26,724	300	7,608	5,650	5,650	42	-1,958	4,368	344
1510	Gray Ranch Co. U-Bar (Pacific Western)	19,896	0	19,896	4,548	0	4,548	4,318	4,318	0	-230	4,271	0
2024	Heard Ranch (Pacific Western)	14,826	6,924	21,750	2,196	24	1,356	1,177[a]	1,177	55	-179	2,782	247
*2027	Hatchet Ranch (M. Everhart)	115,729	42,757	158,486	19,653	0	13,944	13,373	13,373	184	-571	15,010	317
2045	J.E. and Billie Smith (Hatchet Ranch)	9,245	3,245	12,490	2,160	0	1,920	1,218	1,218	15	-702	1,536	49
1501	Allen Foster	2,480	0	2,480	528	0	528	528	528	33	0	528	67
1502	Mrs. Joe D. Croom	150	0	150	24	0	24	24	24	0	0	24	0
1506	Dunagan Land and Cattle Co.	3,965	0	3,965	816	0	816	816	816	14	0	816	30
1507	Mrs. Jeff L. Dunagan (Lenora Rand)	145	0	145	24	0	24	24	24	0	0	24	0
1508	Robert and Jessie Evans	4,228	0	4,228	756	0	756	756	756	48	0	756	108
1509	Godfrey Place (Victorio Co.)	3,080	0	3,080	600	0	600	600	600	0	0	600	0
1511	44 Ranch (Victorio Co.)	440	0	440	108	0	108	108	108	0	0	108	0
*1512	Drummond Hadley	4,785	0	4,785	1,140	0	1,140	1,111	1,111	0	-29	951	0
1514	Joe S. Jackson	4,240	0	4,240	1,020	0	1,020	1,020	1,020	13	0	1,020	29
1515	William Kambitch	1,018	0	1,018	144	0	144	144	144	1	0	144	3
1516	Kimble Brothers	1,360	0	1,360	324	0	324	324	324	3	0	324	8
1517	Luther Wallace Klump	3,257	0	3,257	576	0	576	576	576	12	0	576	27
1518	Jakie McCants	160	0	160	36	0	36	36	36	0	0	36	0
1519	Cascabel Land and Cattle	600	0	600	192	0	192	192	192	0	0	192	0
1520	Post Office Canyon (W.C. Miller)	1,717	0	1,717	336	0	336	336	336	5	0	336	11
1521	James F. Richards	1,450	0	1,450	108	0	108	108	108	11	0	108	24
1522	Richard C. Richards	640	0	640	180	0	180	180	180	0	0	180	0
1523	W.G. and Ruby Richards	1,190	0	1,190	144	0	144	144	144	12	0	144	26
1524	C.E. Roark	40	0	40	12	0	12	12	12	0	0	12	0
1526	R.T. and K.T. Scholes	2,511	0	2,511	672	0	672	672[b]	672	3	0	672	8
1527	Richard Winkler	3,505	0	3,505	504	0	504	504	504	17	0	504	41
1528	Virginia Slover	1,300	0	1,300	312	0	312	312	312	0	0	312	1
1532	Upshaw (Victorio Co.)	320	0	320	72	0	72	72	72	0	0	72	0
1533	Woodard Place (Harriet Green)	150	0	150	36	0	36	36	36	0	0	36	0
1534	W.H. Walter, Sr.	1,399	0	1,399	324	0	324	324	324	2	0	324	4
1536	Clayton Yarbrough	2,020	0	2,020	324	0	324	324	324	1	0	324	2
1539	Billy Darnell	1,080	0	1,080	156	0	156	156	156	0	0	156	0
1540	Jewel Birtrong	1,079	0	1,079	204	0	204	204	204	16	0	204	35
1542	W.H. Walter, Jr.	1,681	0	1,681	312	0	312	312	312	2	0	312	4
1543	Gray Ranch (Victorio Co.)	2,964	0	2,964	612	0	612	612	612	0	0	612	0
1544	Muriel F. Johnson	2,293	0	2,293	372	0	372	372	372	0	0	372	0
1548	George E. Pendleton	40	0	40	12	0	12	12	12	0	0	12	0
1549	Timberlake (Victorio Co.)	4,320	0	4,320	948	0	948	948	948	0	0	948	0
1553	Alan Koff	190	0	190	36	0	36	36	36	0	0	36	0
1556	Keeler	2,968	0	2,968	540	0	540	540	540	3	0	540	8
2532	Great Lakes - Hatchita (Pacific Western)	2,680	0	2,680	564	0	564	564	564	0	0	564	0
TOTAL - HIDALGO COUNTY		743,214	460,986	1,204,200	192,381	875	114,168	100,364	100,364	1,569	-13,804	114,012	2,845
					Luna County								
2003	Columbus Development Board (Lee Baker)	10,365	5,263	15,628	1,699	11	1,099	1,099	1,099	0	0	1,099	0
*2004	Allen and R. Borde	26,959	4,040	30,999	4,200	48	3,612	2,276	2,276	0	-1,336	3,332	0
2005	Florida Ranch (Matti McCauley)	4,011	617	4,628	960	0	840	847	847	0	+7	847	0

Allotment Number	Allotment Name	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Present Allocations (AUMs): Total AUMs (Private, State, Federal)	Present Allocations (AUMs): Big Game	Present Allocations (AUMs): Preference (Federal)	Present Allocations (AUMs): 5-Year Average Licensed Use	Proposed Forage Allocations (Federal AUMs): Livestock	Proposed Forage Allocations (Federal AUMs): Big Game	Changes from Preference (AUMs)	Projected Goal by Year 2010 (AUMs): Livestock	Projected Goal by Year 2010 (AUMs): Big Game
	Luna County (continued)												
2006	Zay S. Clopton	45,115	5,820	50,935	8,832	80	7,788	7,772	7,772	0	-16	7,772	0
2007	Nathan W. Crawford	5,818	2,506	8,324	696	0	444	444	444	5	0	924	7
2008	Neal E. Crawford (Lee Baker)	5,403	1,476	6,879	624	0	516	516	516	3	0	866	5
2009	Rockwell Davis (Tom Hyatt)	5,330	1,280	6,610	684	0	564	413[a/]	413	0	-151	665	0
2012	Tom Miller	2,720	0	2,720	504	0	504	504	504	0	0	504	0
2528	Tom Miller	710	0	710	180	0	180	180	180	0	0	180	0
*2013	Burdick Hills (Alamo Ranch Co.)	78,498	48,773	127,271	20,278	280	12,202	8,546	8,546	0	-3,656	10,902	0
2535	Burdick Hills - West (Alamo Ranch Co.)	178	0	178	26	0	26	24	24	0	-2	0	0
*2014	Cedar Grove (Thomas Ellingwood)	19,757	3,917	23,674	4,219	140	3,408	2,454	2,454	6	-954	2,899	9
2015	Black Top (Bobby Gean Fairall)	4,720	2,240	6,960	1,536	24	1,032	1,042	1,042	0	+10	654	0
2017	Flying W Ranch (Richard Faulkner)	20,917	4,342	25,259	4,200	84	3,612	2,264	2,264	1	-1,348	3,226	1
2018	Russell Baker	12,157	1,699	13,856	2,160	24	1,764	1,772	1,772	5	+8	2,790	10
2019	William Jarvis (Spear 7 Ranch)	15,540	2,811	18,351	1,380	12	1,200	1,068	1,068	0	-132	1,078	0
2020	C.W. Gaines	2,665	0	2,665	432	12	432	387[a/]	387	0	-45	409	0
2533	C.W. Gaines	160	0	160	24	0	24	22[a/]	22	0	-2	0	0
2021	Carl Graham	3,080	1,895	4,975	948	0	540	549	549	0	+9	605	0
2025	Gerald Greeman	7,990	1,940	9,930	2,451	0	1,983	1,974	1,974	61	-9	1,857	92
2026	Sam Teague (Claude Leyendecker)	2,525	666	3,191	360	0	288	288	288	0	0	288	0
2028	Joe and Frank Hervol	1,760	2,720	4,480	612	12	276	276	276	0	0	276	0
2029	Ross May (Carl Hoagland)	1,174	1,232	2,406	540	24	264	264	264	3	0	213	5
2030	Mimbres Mountain Rush (L.B. Hyatt)	11,057	5,800	16,857	2,592	0	1,548	1,103	1,103	51	-445	1,739	80
2032	W.R. Johnson and Son	15,728	5,209	20,937	4,826	36	3,456	3,239	3,239	0	-217	2,930	0
2033	Koenig Ranch	24,535	7,670	32,205	3,552	0	2,436	1,194	1,194	31	-1,242	2,703	47
2536	Koenig Ranch	320	0	320	36	0	36	36	36	0	0	0	0
*2034	Mashed O Venture (Tom Cooper)	70,340	16,007	86,347	14,760	252	12,228	8,857	8,857	7	-3,371	12,323	11
2540	Mashed O Venture (Tom Cooper)	260	0	260	36	0	36	36	36	0	0	0	0
2035	May, Inc.	9,220	9,266	18,486	3,272	0	1,500	1,302	1,302	48	-198	1,451	72
2539	May, Inc.	800	0	800	252	0	252	239	239	0	-13	0	0
2036	Ross and Anita May	10,290	2,160	12,450	1,648	0	1,348	1,214	1,214	0	-134	1,298	0
2038	Ed W. Nunn, Jr. (SR)	15,624	9,603	25,227	6,516	0	3,948	3,155	3,155	0	-793	3,155	0
2039	Joe B. Nunn	506	2,760	3,266	624	0	96	96	96	1	0	299	3
2518	Joe B. Nunn	760	0	760	144	0	144	144	144	0	0	0	0
*2040	Black Mountain Ranch	12,203	3,005	15,208	2,712	0	1,620	932	932	0	-688	1,203	0
2041	Delia Perez (Tom Perez)	7,180	2,800	9,980	720	0	552	554	554	2	+2	590	2
2042	T. Perez Foust	5,603	2,781	8,384	1,416	0	864	603	603	0	-261	447	0
2043	Shelby Phillips	15,114	17,441	32,555	4,596	0	1,716	1,367	1,367	0	-349	1,381	0
2537	Shelby Phillips	1,442	0	1,442	168	0	168	168	168	0	0	0	0
*2046	William and Mary Smyer	13,511	3,005	16,516	2,880	12	2,364	2,071	2,071	7	-293	2,346	11
2047	Barney Teague	840	0	840	84	0	84	84	84	0	0	84	0
2048	Sam Teague et al. (Claude Leyendecker)	592	0	592	120	0	120	120	120	0	0	120	0
2053(3016)	POL West (Lawrence Herrmann)	2,930	0	2,930	260	0	260	260	260	0	0	253	0
3028	Hyatt and Hyatt (Tom Hyatt)	32,918	13,977	46,895	9,312	24	6,768	4,778	4,778	17	-1,990	6,347	26
2501	W.T. Anderson	1,620	0	1,620	108	0	108	108	108	0	0	108	0
2502	Marguerite Benedict	1,080	0	1,080	144	0	144	144	144	0	0	144	0
2503	Red Mountain Ranch (J. Cottrel)	2,363	0	2,363	240	0	240	212	212	0	-28	212	0
2505	Black Mountain Ranch	2,962	0	2,962	420	0	420	420	420	0	0	420	0
2506	Hatcher - East	40	0	40	12	0	12	12	12	0	0	12	0
2507	Mike Cervi	26	0	26	12	0	12	12	12	0	0	12	0
2508	James W. Hurt	6,544	0	6,544	708	0	708	596	596	0	-112	596	0
2509	John William Hatcher	320	0	320	60	0	60	60	60	0	0	60	0
2510	Lauro Guaderrama	320	0	320	24	0	24	24	24	0	0	24	0
2511	Joe Hervol	160	0	160	12	0	12	12	12	0	0	12	0
2512	Mrs. Claude S. Irwin	160	0	160	24	0	24	24	24	0	0	24	0
2513	William Jarvis - North (Spear 7 Ranch)	1,280	0	1,280	84	0	84	84	84	0	0	84	0
2514	G.A. Jones	160	0	160	24	0	24	24	24	0	0	24	0
2515	Kretek Corporation	140	0	140	24	0	24	24	24	0	0	24	0
2516	Jesse Mauer	560	0	560	96	0	96	96	96	0	0	96	0
2517	J.L. McCauley Estate	1,280	0	1,280	288	0	288	288	288	0	0	288	0
2519	Edward Nunn, Jr.	4,319	0	4,319	528	0	528	528	528	0	0	528	0
2520	Tommy W. Perez	2,907	0	2,907	528	0	528	528	528	0	0	528	0
2522	Tony Salopek	310	0	310	48	0	48	48	48	0	0	48	0
2523	Frank Smyer	534	0	534	60	0	60	60	60	0	0	60	0

APPENDIX F-1 (continued)

Allotment Number	Allotment Name	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Present Allocations (AUMs): Total AUMs (Private, State, Federal)	Present Allocations (AUMs): Big Game	Present Allocations (AUMs): Preference (Federal)	Present Allocations (AUMs): 5-Year Average Licensed Use	Proposed Forage Allocations (Federal AUMs): Livestock	Proposed Forage Allocations (Federal AUMs): Big Game	Changes from Preference (AUMs)	Projected Goal by Year 2010 (AUMs): Livestock	Projected Goal by Year 2010 (AUMs): Big Game
	Luna County (continued)												
2524	Bill Speir	3,205	0	3,205	612	0	612	612	612	0	0	612	0
2525	Ronald E. Gibson (Tom Miller)	760	0	760	120	0	120	120	120	0	0	120	0
2526	G. Voss Yates	1,690	0	1,690	336	0	336	336	336	0	0	336	0
2529	POL (Lawrence Herrmann)	40	0	40	12	0	12	11	11	0	-1	11	0
2530	R. Baker and T. Turner	1,280	0	1,280	324	0	324	324	324	0	0	324	0
2531	Lee Baker (East)	630	0	630	84	0	84	84	84	0	0	84	0
2534	James L. Foster	183	0	183	12	0	12	12	12	0	0	12	0
2538	Border Ranch (Thousand Springs)	1,668	0	1,668	156	0	156	156	156	0	0	156	0
**2541	Danny Wiles	320	0	320	24	0	24	24	24	0	0	24	0
4525	Genevieve Gunter	3,760	0	3,760	912	0	912	924	924	0	+12	924	0
TOTAL - LUNA COUNTY		569,946	194,721	764,667	124,107	1,075	90,178	72,440	72,440	248	-17,738	85,962	381
	Grant County												
1004	C. and R. Anderson	3,880	3,920	7,800	1,260	12	660	700	700	0	+40	549	0
1007	Langford Keith	10,159	8,775	18,934	6,000	48	3,372	3,234	3,234	0	-138	2,843	0
4501e/	Langford Keith	615	0	615	204	0	204	118	118	0	-86	92	0
*1011	L.A. Conner	1,920	1,903	3,823	924	0	480	407	407	1	-73	180	2
1022	John S. Hamilton (Flying A Cattle Co.)	3,200	0	3,200	636	0	636	636	636	15	0	487	24
1513	John S. Hamilton (Flying A Cattle Co.)	440	0	440	84	0	84	84	84	0	0	0	0
1023	Grant Harper	3,014	1,079	4,093	720	12	468	468	468	0	0	304	0
1036	Steeple Rock (Garth Lunt)	2,495	1,405	3,900	948	12	552	401	401	0	-151	570	0
1039	High Lonesome Ranch (Langford Keith)	9,905	7,644	17,549	3,466	36	1,846	1,791	1,791	0	-55	1,676	0
1045	Registered Pasture (Gerald Lyda, Sr.)	1,000	0	1,000	288	0	288	252a/	252	0	-36	281	0
1046	Brock Place (Gerald Lyda, Sr.)	4,710	5,860	10,570	2,400	0	1,056	818a/	818	0	-238	1,245	0
1047	Tom McCauley and Sons	15,095	9,100	24,195	4,301	0	4,092	3,456a/	3,456	0	-636	4,210	0
1049	New Mexico Department of Game and Fish (Ralph Wright)	232	1,949	2,181	336	0	60	60	60	0	0	60	0
1051	Redrock (Pacific Western)	4,305	0	4,305	720	0	720	684	684	0	-36	682	0
1075	Redrock (Fred Little)	915	1,475	2,390	600	0	180	180	180	0	0	180	0
*2010	Dan-P-Nel Land Inc.	7,795	5,614	13,409	1,548	0	876	639	639	0	-237	939	0
*2011	Andy Peterson (Clem Donaldson)	13,353	4,885	18,238	2,556	24	1,788	1,632	1,632	3	-156	1,814	5
2023	Hachita Division (Pacific Western)	118,079	202,475	320,554	47,004	0	16,380	12,625	12,625	24	-3,755	15,570	61
2044	J.M. and Virgie T. Smith	16,513	3,630	20,143	3,624	60	3,012	3,008	3,008	57	-4	2,535	180
2050	Nadine E. Moore	1,880	0	1,880	264	0	264	235	235	0	-29	235	0
1550	Muir Ranch East (John T. Muir Ranch)	2,360	0	2,360	408	0	408	408	408	0	0	408	0
2504	Cerro Mesa Ranch	4,267	0	4,267	1,056	0	1,056	1,056	1,056	0	0	1,056	0
2521	Richardson et al.	92	0	92	12	0	12	12	12	0	0	12	0
4502	John Wallace	2,490	0	2,490	984	0	984	924	924	0	-60	924	0
4503	Ruby Wallace Bell	3,110	0	3,110	1,140	0	1,140	1,140	1,140	0	0	1,140	0
4504	Bell and Stailey	1,684	0	1,684	504	0	504	504	504	0	0	504	0
4505	Hatcher - West	375	0	375	48	0	48	48	48	0	0	48	0
4506	Joseph Bennett	3,689	0	3,689	1,332	0	1,332	1,332	1,332	0	0	1,332	0
4507	Lewis Brown	40	0	40	12	0	12	12	12	0	0	12	0
4509	Kern and Ann Chester	270	0	270	48	0	48	48	48	0	0	48	0
4510	Crumbley Brothers	40	0	40	8	0	8	12	12	0	+4	12	0
4511	De La O Estate	160	0	160	60	0	60	60	60	0	0	60	0
4512	Homer Delancey	240	0	240	60	0	60	60	60	0	0	60	0
4513	Joe and Jimmy Delk	2,063	0	2,063	348	0	348	348	348	0	0	348	0
4514	Forrest Delk	4,525	0	4,525	888	0	888	888	888	0	0	888	0
4515	Robert D. Upton	165	0	165	60	0	60	60	60	0	0	60	0
4516	Wayne Dickerson	2,790	0	2,790	1,020	0	1,020	1,020	1,020	0	0	1,020	0
4517	Delk and Eby Ranch	3,560	0	3,560	1,068	0	1,068	1,068	1,068	0	0	1,068	0
4518	Jonnie J. McDonald	464	0	464	168	0	168	168	168	0	0	168	0
4519	Whiskey Creek (Richard Fahrlander)	550	0	550	120	0	120	120a/	120	0	0	120	0
4520	Madeline M. Foster	200	0	200	60	0	60	60	60	0	0	60	0
4521	Foy Partnership	531	0	531	132	0	132	132	132	0	0	132	0
4522	Franks Ranch Inc.	5,002	0	5,002	1,500	0	1,500	1,500	1,500	0	0	1,500	0
4523	Marie M. Frost	2,400	0	2,400	708	0	708	708	708	0	0	708	0
4524	Marvin Glenn	160	0	160	48	0	48	48	48	0	0	48	0

APPENDIX F-1 (concluded)

Allotment Number	Allotment Name	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Present Allocations (AUMs)				Proposed Forage Allocations (Federal AUMs)		Changes from Preference (AUMs)	Projected Goal by Year 2010 (AUMs)	
					Total AUMs (Private, State, Federal)	Big Game	Preference (Federal)	5-Year Average Licensed Use	Livestock	Big Game		Livestock	Big Game
	Grant County (continued)												
4526	T. Harrington Estate	600	0	600	120	0	120	120	120	0	0	120	0
4527	W.B. Hinton	760	0	760	180	0	180	180	180	0	0	180	0
4528	Mrs. Joe H. Hooker	3,620	0	3,620	780	0	780	780	780	0	0	957	0
4529	Pitchfork Ranch	3,597	0	3,597	1,104	0	1,104	1,104	1,104	0	0	1,104	0
4530	Jarrell-Miller (John T. Muir Ranch)	15,306	0	15,306	2,460	0	2,460	2,460	2,460	0	0	2,460	0
4531	Paul Childress	174	0	174	36	0	36	36	36	0	0	36	0
4532	Harry McCauley	104	0	104	24	0	24	24	24	0	0	24	0
4533	Marie Brock McCauley	2,080	0	2,080	720	0	720	720	720	0	0	720	0
4534	R.J. McCauley	120	0	120	36	0	36	36	36	0	0	36	0
4535	E.W. Richardson	405	0	405	120	0	120	120	120	0	0	120	0
4536	T. Carroll Niblett	377	0	377	72	0	72	72	72	0	0	72	0
4537	Pacific Western	3,860	0	3,860	1,008	0	1,008	1,008	1,008	0	0	1,008	0
4538	Three Sisters (Prevost Cattle Co.)	80	0	80	12	0	12	12	12	0	0	12	0
4539	Rolland Rice and Son	640	0	640	156	0	156	156	156	0	0	156	0
4540	Della W. Richardson	2,760	0	2,760	480	0	480	480	480	0	0	480	0
4541	Spires Cattle Co.	2,103	0	2,103	648	0	648	648	648	0	0	648	0
4542	T & M Dairy Inc.	63	0	63	12	0	12	12	12	0	0	12	0
4543	Todd and Pugmire	716	0	716	132	0	132	132	132	0	0	132	0
4544	James B. Turner	49	0	49	12	0	12	12	12	0	0	12	0
4545	Warren et al.	160	0	160	24	0	24	24	24	0	0	24	0
4546	Wesley Brown	594	0	594	156	0	156	156	156	0	0	156	0
4547	Patricia S. Crumbley (Eby Ranch)	4,634	0	4,634	1,248	0	1,248	1,224	1,224	0	-24	1,224	0
4548	Norris James E., Ray A.	1,520	0	1,520	528	0	528	528	528	0	0	528	0
4549	Nadine E. Moore	5,670	0	5,670	960	0	960	960	960	0	0	960	0
4550	Donald Hooker et al.	40	0	40	12	0	12	12	12	0	0	12	0
4551	Clint Johnson, Jr.	46	0	46	12	0	12	12	12	0	0	12	0
4552	Charles Judd	80	0	80	24	0	24	23	23	0	-1	23	0
4553	Genevieve Gunter	40	0	40	12	0	12	12	12	0	0	12	0
TOTAL - GRANT COUNTY		310,930	259,714	570,644	100,763	204	59,898	54,227	54,227	100	-5,671	57,428	272

Summary

County	Acres Public Land	Acres Other Ownership	Total Allotment Acreage	Present Allocations (AUMs)				Proposed Forage Allocations (Federal AUMs)		Changes from Preference (AUMs)	Projected Goal by Year 2010 (AUMs)	
				Total AUMs (Private, State, Federal)	Big Game	Preference (Federal)	5-Year Average Licensed Use	Livestock	Big Game		Livestock	Big Game
HIDALGO	743,214	460,986	1,204,200	192,381	875	114,168	100,364	100,364	1,569	-13,804	114,012	2,845
LUNA	569,946	194,721	764,667	124,107	1,075	90,178	72,440	72,440	248	-17,738	85,962	381
GRANT	310,930	259,714	570,644	100,763	204	59,898	54,227	54,227	100	-5,671	57,428	272
TOTALS FOR 3-COUNTY AREA	1,624,090	915,421	2,539,511	417,251	2,154	264,244	227,031	227,031	1,917	-37,213	257,402	3,498
UNALLOTTED FOR 3-COUNTY AREA	7,663	0	7,663	0	0	0	0	0	0	0	0	0
GRAND TOTAL	1,631,753	915,421	2,547,174	417,251	2,154	264,244	227,031	227,031	1,917	-37,213	257,402	3,498

Source: BLM Las Cruces District Office files, 1982.

Notes: *Indicates allotments with Allotment Management Plans.
**Split with Allotment 2506.
a/Figured on 4-year average.
b/Figured on 3-year average.
c/Figured on 2-year average.
d/Figured on 1-year average.
e/Part of this allotment is contained within Allotment 1007. Both pieces are listed together with 1007.

APPENDIX F-2

PROPOSED MANAGEMENT CATEGORIES BY ALLOTMENT

Category I

Category M

Category C

Hidalgo County

Category I

1001
*1006
1008
1009
1012
1013
1014
1015
1016 (4%)[a/]
1017-1505[b/]
1019 (56%)[a/]
1025
1026-1538[b/]
*1027
1030
1032-1545[b/]
1034
*1041
*1044
1048
1050 (79%)[a/]
1055-1547[b/]
1057
1059
1060 (22%)[a/]
1063
1066
1069-1554[b/]
1070-1555[b/]
1071
1073
1076
1078
2022
1510
2024 (47%)[a/]
*2027
2045
*1512

Category M

1002
1005-1541[b/]
1010
1018
1019 (44%)[a/]
1021
1024
1029
1031
1033
1050 (21%)[a/]
1052
1053
1056
1058-1546[b/]
1060 (78%)[a/]
1061
1062
1064
1077
1079
1080
2016
2024 (53%)[a/]
1501
1502
1506
1507
1508
1509
1511
1514
1515
1516
1517
1518
1519
1520
1521
1522
1523
1524
1526
1527
1528
1532
1533
1534
1536
1539
1540
1542
1543
1544
1548
1549
1553
1556
2532

Category C

1003
1016 (96%)[a/]
1028
1035
1038-1551[b/]
1042
1043
1065
1068
1072
1074-1537[b/]

APPENDIX F-2 (continued)

Category I	Category M	Category C
	Luna County	
*2004	2005	2003
2007 (47%)[a]	2006	2007 (53%)[a]
2008 (12%)[a]	2012	2008 (88%)[a]
2009	2528	2028
*2013-2535[b]	2020-2533[b]	2041 (93%)[a]
*2014	2026	2047
2015	2038	2048
2017	2501	2053(3016)
2018	2502	
2019	2503	
2021	2505	
2025	2506	
2029	2507	
2030	2508	
2032	2509	
2033-2536[b]	2510	
*2034-2540[b]	2511	
2035-2539[b]	2512	
2036	2513	
2039-2518[b]	2514	
*2040	2515	
2041 (7%)[a]	2516	
2042	2517	
2043-2537[b]	2519	
*2046	2520	
3028	2522	
	2523	
	2524	
	2525	
	2526	
	2529	
	2530	
	2531	
	2534	
	2538	
	2541	
	4525	

APPENDIX F-2 (concluded)

Category I	Category M		Category C
	Grant County		
1004	1051 (98%)a/	4524	1049
1007	2023 (68%)a/	4526	1075
*1011	2050	4527	
1022-1513b/	1550	4529	
1023	2504	4530	
1036	2521	4531	
1039	4501c/	4532	
1045	4502	4533	
1046	4503	4534	
1047	4504	4535	
1051 (2%)a/	4505	4536	
*2010	4506	4537	
*2011	4507	4538	
2023 (32%)a/	4509	4539	
2044	4510	4540	
4528	4511	4541	
	4512	4542	
	4513	4543	
	4514	4544	
	4515	4545	
	4516	4546	
	4517	4547	
	4518	4548	
	4519	4549	
	4520	4550	
	4521	4551	
	4522	4552	
	4523	4553	

Source: BLM Las Cruces District Office files, 1982.

Notes: *Indicates allotments with Allotment Management Plans.

a/Indicates allotments in more than one category and shows the percent in each category.

b/Allotments controlled by the same permittee and run as one grazing unit.

c/Part of this allotment is included within Allotment 1007.

APPENDIX F-3

CRITERIA USED FOR CATEGORIZING I, M, AND C ALLOTMENTS

The following criteria pertain to the three identified categories, although allotments within each category will not have to meet all the criteria to be managed according to the category objectives.

Category I (Improve Category) Criteria

--Present rangeland condition is unsatisfactory.
--Allotments have moderate to high resource production potential and are producing at low to moderate levels.
--Serious resource-use conflicts/controversy exists.
--Opportunities exist for positive economic return from public investments.
--Present management appears unsatisfactory.
--Other criteria appropriate to the 3-County Area.

Category M (Maintain Category) Criteria

--Present rangeland condition in satisfactory.
--Allotments have moderate or high resource production potential, and are producing near their potential (or trend is moving in that direction).
--No serious resource-use conflicts/controversy exist.
--Opportunities may exist for positive economic return from public investments.
--Present management appears satisfactory.
--Other criteria appropriate to the 3-County Area.

Category C (Custodial Category) Criteria

--Present rangeland condition is not a factor.
--Allotments have low resource production potential, and are producing near their potential.
--Limited resource-use conflicts/controversy may exist.
--Opportunities for positive economic return on public investment do not exist or are constrained by technological or economic factors.
--Present management appears satisfactory or is the only logical practice under existing resource conditions.
--Other criteria appropriate to the 3-County Area.

Source: BLM Final Grazing Management Policy, 1982.

PROPOSED RANGELAND DEVELOPMENTS[a/]
(PROPOSED ACTION AND ENHANCEMENT OF OTHER RESOURCE VALUES ALTERNATIVE)

Allotment Number	Development[b/]	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
			Hidalgo County					
*1006	Pipeline	4 mi.	1.50	.10	6.00	.40	$ 5,000	$ 20,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
	Erosion Dike (1,110 cu.yds.)	6	1.00	c/	6.00	c/	1,000	6,000
1009	Pipeline	5 mi.	1.50	.10	7.50	.50	5,000	25,000
	Dirt Tank (8,000 cu. yds.)	3	3.80	1.80	11.40	5.40	8,000	24,000
	Drinking Trough	6	.10	.08	.60	.48	750	4,500
	Fence	3 mi.	1.00	.20	3.00	.60	4,000	12,000
1010	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1012	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1014	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	6¼ mi.	1.00	.20	6.25	1.25	4,000	25,000
1015	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Erosion Dike (1,110 cu. yds.)	2	1.00	c/	2.00	c/	1,000	2,000
1016	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1017	Pipeline	3½ mi.	1.50	.10	5.25	.35	5,000	17,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Dirt Tank (8,000 cu. yds.)	3	3.80	1.80	11.40	5.40	8,000	24,000
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1025	Pipeline	4¼ mi.	1.50	.10	6.38	.43	5,000	21,250
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Fence	4 mi.	1.00	.20	4.00	.80	4,000	16,000
*1027	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Erosion Dike (1,110 cu. yds.)	8	1.00	c/	8.00	c/	1,000	8,000
1030	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
1032	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	2¼ mi.	1.00	.20	2.25	.45	4,000	9,000
1034	Electric Fence	10½ mi.	1.00	.20	10.50	2.10	900	9,450
	Erosion Dike (1,110 cu. yds.)	1	1.00	c/	1.00	c/	1,000	1,000
1041	Erosion Dike (1,110 cu. yds.)	3	1.00	c/	3.00	c/	1,000	3,000
*1044	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
1048	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Storage Tank (20,000 gal.)	2	.30	.05	.60	.10	13,800	27,600
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1050	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
1055	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Erosion Dike (1,110 cu. yds.)	11	1.00	c/	11.00	c/	1,000	11,000
1056	Pipeline	2¼ mi.	1.50	.10	3.38	.23	5,000	11,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
1057	Fence	3/4 mi.	1.00	.20	.75	.15	4,000	3,000
1059	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Well w/pump or windmill	2	.50	.10	1.00	.20	30,000	60,000
	Erosion Dike (1,110 cu. yds.)	6	1.00	c/	6.00	c/	1,000	6,000
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000

APPENDIX F-4 (continued)

Allotment Number	Development[b]	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
			Hidalgo County (continued)					
1062	Fence	2½ mi.	1.00	.20	2.50	.50	$ 4,000	$ 10,000
1063	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
1070	Pipeline	½ mi.	1.50	.10	.75	.05	5,000	2,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
1071	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
1076	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
1078	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	12 3/4 mi.	1.00	.20	12.75	2.55	4,000	51,000
2022	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Umbrella Catchment[d]	2	.03	.03	.06	.06	3,000	6,000
1510	Pipeline	¼ mi.	1.50	.10	.38	.03	5,000	1,250
*2027	Pipeline	4½ mi.	1.50	.10	6.75	.45	5,000	22,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Dirt Tank (8,000 cu. yds.)	2	3.80	1.80	7.60	3.60	8,000	16,000
*1512	Pipeline	½ mi.	1.50	.10	.75	.05	5,000	2,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Dirt Tank (8,000 cu. yds.)	2	3.80	1.80	7.60	3.60	8,000	16,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1514	Umbrella Catchment[d]	1	.03	.03	.03	.03	3,000	3,000
1527	Umbrella Catchment[d]	1	.03	.03	.03	.03	3,000	3,000
Subtotal - Hidalgo County					208.61	44.56		$1,028,550
			Luna County					
*2004	Pipeline	3 3/4 mi.	1.50	.10	5.63	.38	5,000	18,750
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
*2013	Dirt Tank (8,000 cu. yds.)	8	3.80	1.80	30.40	14.40	8,000	64,000
*2014	Pipeline	½ mi.	1.50	.10	.75	.05	5,000	2,500
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Cattleguard	1	.06	.06	.06	.06	3,000	3,000
	Erosion Dike (1,110 cu. yds.)	5	1.00	c/	5.00	c/	1,000	5,000
2015	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
2017	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
	Erosion Dike (1,110 cu. yds.)	10	1.00	c/	10.00	c/	1,000	10,000
2018	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Erosion Dike (1,110 cu. yds.)	4	1.00	c/	4.00	c/	1,000	4,000
2021	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
2032	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
2033	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750

Allotment Number	Development b/	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
			Luna County (continued)					
*2034	Pipeline	5½ mi.	1.50	.10	8.25	.55	$ 5,000	$ 27,500
	Erosion Dike (1,110 cu. yds.)	5	1.00	c/	5.00	c/	1,000	5,000
2036	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
*2040	Pipeline	4½ mi.	1.50	.10	6.75	.45	5,000	22,500
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
2042	Erosion Dike (1,110 cu. yds.)	7	1.00	c/	7.00	c/	1,000	7,000
2043	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
*2046	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
3028	Fence	1½ mi.	1.00	.20	1.50	.30	4,000	6,000
Subtotal - Luna County					119.59	21.85		$360,750
			Grant County					
1007	Fence	3½ mi.	1.00	.20	3.50	.70	4,000	14,000
1036	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1047	Fence	3½ mi.	1.00	.20	3.50	.70	4,000	14,000
1049	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1051	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	2 mi.	1.00	.20	2.00	.40	4,000	8,000
4528	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
Subtotal - Grant County					16.30	4.30		$58,000
TOTAL					344.50	70.71		$1,447,300

Summary

	Hidalgo County	Luna County	Grant County	Total
Storage Tank	12	5	0	17
Well w/pump or windmill	11	0	0	11
Drinking Trough	35	12	0	47
Dirt Tank	15	9	1	25
Pipeline	37.25 mi.	29.75 mi.	0	67.00 mi.
Fence	35.50 mi.	7.00 mi.	12.50 mi.	55.00 mi.
Cattleguard	0	1	0	1
Erosion Dike	37	31	0	68
Umbrella Catchment	4	0	0	4

Short-Term Total = 344.50 acres disturbed
Long-Term Total = 70.71 acres disturbed
Total Cost = $1,447,300.00

Source: BLM Las Cruces District Office files, 1982.

Notes: *Indicates allotments with Allotment Management Plans.

a/Rangeland developments are proposed for livestock and wildlife. Most developments are proposed for livestock but wildlife would benefit. An additional 7 3/4 miles of fence at an estimated cost of $31,000 are proposed under the EORV Alternative. Short-term acres disturbed would be 7.75 and long-term disturbance would be 1.55 acres.

b/Depth of wells and size of storage tanks and dikes will vary. The costs are an estimated average.

c/There would be minimal long-term disturbance.

d/These developments are proposed solely for wildlife.

APPENDIX F-5

PROPOSED RANGELAND DEVELOPMENTS a/
(MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE)

Allotment Number	Development b/	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
	Hidalgo County							
1001	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	$13,800	$13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
1002	Storage Tank (20,000 gal.)	1	.30	.50	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
1003	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
1005	Pipeline	½ mi.	1.50	.10	.75	.05	5,000	2,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	1	.10	.08	.10	.08	750	750
*1006	Pipeline	5½ mi.	1.50	.10	8.25	.55	5,000	27,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	3 3/4 mi.	1.00	.20	3.75	.94	4,000	15,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Erosion Dike (1,110 cu. yds.)	6	1.00	c/	6.00	c/	1,000	6,000
1008	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	1	.10	.08	.10	.08	750	750
1009	Pipeline	5½ mi.	1.50	.10	8.25	.55	5,000	27,500
	Dirt Tank (8,000 cu. yds.)	4	3.80	1.80	15.20	7.20	8,000	32,000
	Drinking Trough	8	.10	.08	.80	.64	750	6,000
	Fence	7 mi.	1.00	.20	7.00	1.40	4,000	28,000
1010	Pipeline	7 mi.	1.50	.10	10.50	.70	5,000	35,000
	Storage Tank (20,000 gal.)	2	.30	.05	.60	.10	13,800	27,600
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Well w/pump or windmill	3½ mi.	.50	.10	1.50	.30	30,000	90,000
	Fence	3 mi.	1.00	.20	3.50	.70	4,000	14,000
1012	Pipeline	2 3/4 mi.	1.50	.10	4.13	.28	5,000	13,750
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1014	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	6¼ mi.	1.00	.20	6.25	1.25	4,000	25,000
1015	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Erosion Dike (1,110 cu. yds.)	2	1.00	c/	2.00	c/	1,000	2,000
1016	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1017	Pipeline	3½ mi.	1.50	.10	5.25	.35	5,000	17,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Dirt Tank (8,000 cu. yds.)	3	3.80	1.80	11.40	5.40	8,000	24,000
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1018	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
1019	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
1021	Dirt Tank	1	3.80	1.80	3.80	1.80	8,000	8,000
1024	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500

PROPOSED RANGELAND DEVELOPMENTS a/
(MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE)

Allotment Number	Development b/	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
			Hidalgo County (continued)					
1025	Pipeline	6¼ mi.	1.50	.10	9.38	.63	$ 5,000	$31,250
	Drinking Trough	6	.10	.08	.60	.48	750	4,500
	Storage Tank (20,000 gal.)	2	.30	.05	.60	.10	13,800	27,600
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	6 mi.	1.00	.20	6.00	1.20	4,000	24,000
1026	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
*1027	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Erosion Dike (1,110 cu. yds.)	8	1.00	c/	8.00	c/	1,000	8,000
1028	Drinking Trough	1	.10	.08	.10	.08	750	750
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Erosion Dike (1,110 cu. yds.)	1	1.00	c/	1.00	c/	1,000	1,000
1029	Pipeline	½ mi.	1.50	.10	.75	.05	5,000	2,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
1030	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
1032	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Dirt Tank (8,000) cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	2¼ mi.	1.00	.20	2.25	.45	4,000	9,000
1033	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
1034	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	9 mi.	1.00	.20	9.00	1.80	4,000	36,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Electric Fence	10½ mi.	1.00	.20	10.50	2.10	900	9,450
	Erosion Dike (1,110 cu. yds.)	1	1.00	c/	1.00	c/	1,000	1,000
1035	Pipeline	½ mi.	1.50	.10	.75	.05	5,000	2,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
1038	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
*1041	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Storage Tank (20,000 gal.)	2	.30	.05	.60	.10	13,800	27,600
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Erosion Dike (1,110 cu. yds.)	6	1.00	c/	6.00	c/	1,000	6,000
1042	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
1043	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
*1044	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
1048	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Storage Tank (20,000 gal.)	2	.30	.05	.60	.10	13,800	27,600
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	1 mi.	1.00	.20	1.00	.20	4,000	4,000
1050	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
1052	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
1053	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1055	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Erosion Dike (1,110 cu. yds.)	11	1.00	c/	11.00	c/	1,000	11,000

APPENDIX F-5 (continued)

PROPOSED RANGELAND DEVELOPMENTS a/
(MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE)

Allotment Number	Development b/	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
			Hidalgo County (continued)					
1056	Pipeline	2¼ mi.	1.50	.10	3.38	.23	$ 5,000	$11,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Dirt Tank (8,000 cu. yds.)	2	3.80	1.80	7.60	3.60	8,000	16,000
1057	Pipeline	2 mi.	1.50	.20	3.00	.40	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Fence	1 mi.	1.00	.20	1.00	.20	4,000	4,000
1058	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
1059	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Well w/pump or windmill	2	.50	.10	1.00	.20	30,000	60,000
	Erosion Dike (1,110 cu. yds.)	8	1.00	c/	8.00	c/	1,000	8,000
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1060	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1062	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Fence	3 mi.	1.00	.20	3.00	.60	4,000	12,000
1063	Pipeline	2½ mi.	1.50	.10	3.75	.25	5,000	12,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
1066	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1068	Pipeline	4 mi.	1.50	.10	6.00	.40	5,000	20,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1070	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
1071	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1072	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Dirt Tank (8,000 cu. yds.)	2	3.80	1.80	7.60	3.60	8,000	16,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
1074	Dirt Tank (8,000 cu. yds.)	2	3.80	1.80	7.60	3.60	8,000	16,000
1076	Pipeline	1¼ mi.	1.50	.10	1.88	.13	5,000	6,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
1077	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Fence	4 mi.	1.00	.20	4.00	.80	4,000	16,000
1078	Pipeline	3 3/4 mi.	1.50	.10	5.63	.38	5,000	18,750
	Drinking Trough	4	.10	.08	.40	.32	750	3,000
	Fence	13 mi.	1.00	.20	13.00	2.60	4,000	52,000
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1079	Pipeline	2¼ mi.	1.50	.10	3.38	.23	5,000	11,250
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Erosion Dike (1,110 cu. yds.)	8	1.00	c/	8.00	c/	1,000	8,000
2022	Pipeline	8 mi.	1.50	.10	12.00	.80	5,000	40,000
	Drinking Trough	5	.10	.08	.50	.40	750	3,750
	Storage Tank (20,000 gal.)	3	.30	.05	.90	.15	13,800	41,400
	Well w/pump or windmill	2	.50	.10	1.00	.20	30,000	60,000
	Fence	5 mi.	1.00	.20	5.00	1.00	4,000	20,000
	Umbrella Catchment d/	2	.03	.03	.06	.06	3,000	6,000

APPENDIX F-5 (continued)

PROPOSED RANGELAND DEVELOPMENTS [a]
(MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE)

Allotment Number	Development [b]	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
	Hidalgo County (concluded)							
1510	Pipeline	6½ mi.	1.50	.10	9.75	.65	$ 5,000	$32,500
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Storage Tank (20,000 gal.)	2	.30	.05	.60	.10	13,800	27,600
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
2024	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
*2027	Pipeline	21½ mi.	1.50	.10	32.24	2.15	5,000	107,500
	Drinking Trough	8	.10	.08	.80	.64	750	6,000
	Dirt Tank (8,000 cu. yds.)	6	3.80	1.80	22.80	10.80	8,000	48,000
	Well w/pump or windmill	2	.50	.10	1.00	.20	30,000	60,000
	Fence	12 mi.	1.00	.20	12.00	2.40	4,000	48,000
	Cattleguard	1	.06	.06	.06	.06	3,000	3,000
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
2045	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
*1512	Pipeline	1¼ mi.	1.50	.10	1.88	.13	5,000	6,250
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Dirt Tank (8,000 cu. yds.)	2	3.80	1.80	7.60	3.60	8,000	16,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
1514	Umbrella Catchment [d]	1	.03	.03	.03	.03	3,000	3,000
1527	Umbrella Catchment [d]	1	.03	.03	.03	.03	3,000	3,000
	Hidalgo County Subtotal				498.25	104.14		2,879,650
	Luna County							
2003	Pipeline	2 mi.	1.50	.10	3.00	.20	$ 5,000	$10,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
*2004	Pipeline	3 3/4 mi.	1.50	.10	5.63	.38	5,000	18,750
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
2005	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Erosion Dike (1,110 cu. yds.)	6	1.00	[c]	6.00	[c]	1,000	6,000
2008	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	1 mi.	1.00	.20	1.00	.20	4,000	4,000
2009	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
2012	Pipeline	2½ mi.	1.50	.10	3.75	.25	5,000	12,500
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
*2013	Dirt Tank (8,000 cu. yds.)	8	3.80	1.80	30.40	14.40	8,000	64,000
*2014	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Cattleguard	1	.06	.06	.06	.06	3,000	3,000
	Erosion Dike (1,110 cu. yds.)	5	1.00	[c]	5.00	[c]	1,000	5,000
2015	Pipeline	1 3/4 mi.	1.50	.10	2.63	.18	5,000	8,750
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
2017	Pipeline	3½ mi.	1.50	.10	5.25	.35	5,000	17,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	2	.30	.05	.60	.10	13,800	27,600
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	3½ mi.	1.00	.20	3.50	.70	4,000	14,000
	Erosion Dike (1,110 cu. yds.)	10	1.00	[c]	10.00	[c]	1,000	10,000

APPENDIX F-5 (continued)

PROPOSED RANGELAND DEVELOPMENTS a/
(MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE)

Allotment Number	Development b/	Quantity and Unit	Average Acres Disturbed				Average Cost Per Unit	Total Cost
			Per Unit		Total			
			Short-Term	Long-Term	Short-Term	Long-Term		
			Luna County (concluded)					
2018	Pipeline	2½ mi.	1.50	.10	3.75	.25	$ 5,000	$12,500
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Erosion Dike (1,110 cu. yds.)	4	1.00	c/	4.00	c/	1,000	4,000
2019	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Dirt Tank	1	3.80	1.80	3.80	1.80	8,000	8,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
2021	Pipeline	1½ mi.	1.50	.10	2.25	.15	5,000	7,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
2025	Pipeline	2½ mi.	1.50	.10	3.75	.25	5,000	12,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Fence	3½ mi.	1.00	.20	3.50	.70	4,000	14,000
	Erosion Dike (1,110 cu. yds.)	2	1.00	c/	2.00	c/	1,000	2,000
2026	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
2032	Pipeline	2½ mi.	1.50	.10	3.75	.25	5,000	12,500
	Fence	7 mi.	1.00	.20	7.00	1.40	4,000	28,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
2033	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Dirt Tank	1	3.80	1.80	3.80	1.80	8,000	8,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	6 mi.	1.00	.20	6.00	1.20	4,000	24,000
	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
*2034	Pipeline	6 mi.	1.50	.10	9.00	.60	5,000	30,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Erosion Dike (1,110 cu. yds.)	9	1.00	c/	9.00	c/	1,000	9,000
2035	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	7 mi.	1.00	.20	7.00	1.40	4,000	28,000
2036	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Dirt Tank	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	3 mi.	1.00	.20	3.00	.60	4,000	12,000
2038	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	8 mi.	1.00	.20	8.00	1.60	4,000	32,000
*2040	Pipeline	4½ mi.	1.50	.10	6.75	.45	5,000	22,500
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Well w/pump or windmill	2	.50	.10	1.00	.20	30,000	60,000
	Fence	6 mi.	1.00	.20	6.00	1.20	4,000	24,000
2041	Pipeline	3 mi.	1.50	.10	4.50	.30	5,000	15,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
2042	Erosion Dike (1,110 cu. yds.)	7	1.00	c/	7.00	c/	1,000	7,000
2043	Pipeline	6¼ mi.	1.50	.10	9.38	.63	5,000	31,250
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
*2046	Pipeline	1 mi.	1.50	.10	1.50	.10	5,000	5,000
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Storage Tank (20,000 gal.)	1	.30	.05	.30	.05	13,800	13,800
3028	Fence	7½ mi.	1.00	.20	7.50	1.40	4,000	30,000
	Luna County Subtotal				245.45	43.31		1,088,450

APPENDIX F-5 (concluded)

PROPOSED RANGELAND DEVELOPMENTS a/
(MAXMIZATION OF LIVESTOCK FORAGE PRODUCTION ALTERNATIVE)

Allotment Number	Development b/	Quantity and Unit	Average Acres Disturbed Per Unit Short-Term	Average Acres Disturbed Per Unit Long-Term	Average Acres Disturbed Total Short-Term	Average Acres Disturbed Total Long-Term	Average Cost Per Unit	Total Cost
	Grant County							
1004	Pipeline	1½ mi.	1.50	.10	2.25	.15	$ 5,000	$ 7,500
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Fence	3½ mi.	1.00	.20	3.50	.70	4,000	14,000
1007	Fence	3½ mi.	1.00	.20	3.50	.70	4,000	14,000
1022	Drinking Trough	1	.10	.80	.10	.08	750	750
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
1023	Pipeline	2½ mi.	1.50	.10	3.75	.25	5,000	12,500
	Drinking Trough	1	.10	.08	.10	.08	750	750
	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
1036	Fence	3 mi.	1.00	.20	3.00	.60	4,000	12,000
1039	Pipeline	2 mi.	1.50	.10	3.00	.20	5,000	10,000
	Drinking Trough	2	.10	.08	.20	.16	750	1,500
	Fence	2 mi.	1.00	.20	2.00	.40	4,000	8,000
1046	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
1047	Fence	10½ mi.	1.00	.20	10.50	2.10	4,000	42,000
1049	Fence	½ mi.	1.00	.20	.50	.10	4,000	2,000
1051	Dirt Tank (8,000 cu. yds.)	1	3.80	1.80	3.80	1.80	8,000	8,000
	Fence	2 mi.	1.00	.20	2.00	.40	4,000	8,000
*2011	Drinking Trough	1	.10	.08	.10	.08	750	750
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
2023	Pipeline	25 mi.	1.50	.10	37.50	2.50	5,000	125,000
	Drinking Trough	10	.10	.08	1.00	.80	750	7,500
	Storage Tank (20,000 gal.)	4	.30	.50	1.20	2.00	13,800	55,200
	Well w/pump or windmill	1	.50	.10	.50	.10	30,000	30,000
	Fence	12 mi.	1.00	.20	12.00	2.40	4,000	48,000
	Cattleguard	2	.06	.06	.12	.12	3,000	6,000
2050	Pipeline	6 mi.	1.50	.10	9.00	.60	5,000	30,000
	Drinking Trough	3	.10	.08	.30	.24	750	2,250
	Storage Tank (20,000 gal.)	1	.30	.50	.30	.50	13,800	13,800
	Fence	6 mi.	1.00	.20	6.00	1.20	4,000	24,000
4528	Fence	2½ mi.	1.00	.20	2.50	.50	4,000	10,000
	Grant County Subtotal				123.82	24.72		589,000
	TOTAL				867.52	172.17		$4,557,110

Summary

	Hidalgo County	Luna County	Grant County	Grand Total
Storage Tank (20,000 gal.)	34	9	5	48
Well w/pump or windmill	34	9	3	46
Drinking Trough	93	32	20	145
Dirt Tank (8,000 cu. yds.)	33	12	4	49
Pipeline	129.25 mi.	57.25 mi.	37.00 mi.	223.50 mi.
Fence	83.75 mi.	60.50 mi.	48.00 mi.	192.25 mi.
Cattleguard	1	1	2	4
Erosion Dike (1,110 cu. yds.)	51	43	0	94
Umbrella Catchment	4	0	0	4

Short-Term Total = 867.52 acres disturbed
Long-Term Total = 172.17 acres disturbed
Total Cost = $4,557,110.00

Source: BLM Las Cruces District Office Files, 1982.

Notes: *Indicates allotments with AMPs.

a/Proposed Rangeland developments under the Proposed Action and Enhancement of Other Resource Values Alternative are also included in this table. Rangeland developments are proposed for livestock and wildlife. Most developments are proposed for livestock, but wildlife would benefit.

b/Depth of wells and size of storage tanks and dikes will vary. The costs were an estimated average.

c/There would be minimal long-term disturbance.

d/These developments are proposed solely for wildlife use.

APPENDIX F-6

CATEGORIZATION AND PRESENT ACRES IN EACH ECOLOGICAL CONDITION CLASS BY ALLOTMENT[a]

Allotment Number	Public Land Acres	Ecological Condition Class (acres)				Waste Acres
		Excellent	Good	Fair	Poor	
		Category I				
Hidalgo County						
1001	7,121		16	5,994	1,111	
*1006	21,030		0	4,237	16,793	
1008	5,367		0	4,930	437	
1009	28,832		2,071	19,144	7,617	
1012	8,882		0	8,882	0	
1013	2,009		161	136	1,712	
1014	36,947		78	21,632	15,237	
1015	7,701		0	2,099	5,602	
1016[b]	109		0	0	109	
1017-1505[c]	3,453		160	309	2,984	
1019[b]	2,025		0	2,025	0	
1025	6,095		0	4,340	1,755	
1026-1538[c]	12,719		0	10,773	1,946	
*1027	5,478		0	106	5,372	
1030	9,104		0	9,039	65	
1032-1545[c]	6,958		0	193	6,354	411
1034	17,810		2,503	8,680	1,835	4,792
*1041	34,402		9,486	17,746	7,170	
*1044	9,186		0	2,538	6,648	
1048	11,059		0	5,146	5,913	
1050[b]	9,349		0	7,693	1,656	
1055-1547[c]	6,237		605	352	5,280	
1057	5,557		1,692	3,681	184	
1059	35,553		0	15,698	19,855	
1060[b]	1,391		0	0	1,391	
1063	7,730		1,117	6,385	228	
1066	4,409		0	0	4,409	
1069-1554[c]	10,326		308	2,946	7,072	
1070-1555[c]	5,102		0	2,873	2,229	
1071	3,680		0	3,646	34	
1073	11,208		0	9,359	1,849	
1076	2,116		12	1,014	1,090	
1078	30,769		2,480	12,433	15,856	
2022	39,229		2,292	14,469	22,468	
1510	19,184		29	18,275	880	
2024[b]	7,544		0	7,207	337	
*2027	115,055		3,482	75,582	35,991	
2045	8,550		0	6,355	2,195	
*1512	4,718		0	4,591	127	
Subtotal	563,994		26,492	320,508	211,791	5,203

APPENDIX F-6 (continued)

Allotment Number	Public Land Acres	Ecological Condition Class (acres) Excellent	Good	Fair	Poor	Waste Acres
		Category I (continued)				
Luna County						
*2004	26,581		75	17,550	8,956	
2007[b]	2,592		0	2,592	0	
2008[b]	646		0	0	646	
2009	5,359		149	1,697	3,513	
*2013-2535[c]	79,077		7,340	57,792	13,945	
*2014	20,105		971	3,462	15,672	
2015	4,948		343	948	3,657	
2017	20,602		2,088	8,799	9,715	
2018	12,176		1,603	3,360	7,213	
2019	15,637		0	1,593	14,044	
2021	3,199		0	1,455	1,744	
2025	8,142		209	6,544	1,389	
2029	917		0	0	917	
2030	10,856		285	5,137	5,434	
2032	16,158		1,462	7,292	7,404	
2033-2536[c]	24,857		0	12,045	12,812	
*2034-2540[c]	68,366		11,235	39,543	17,588	
2035-2539[c]	9,255		0	3,794	5,461	
2036	10,541		817	6,637	3,087	
2039-2518[c]	1,232		0	285	947	
*2040	12,119		561	6,473	5,085	
2041[b]	504		0	0	504	
2042	5,873		242	3,180	2,451	
2043-2537[c]	16,642		26	97	16,519	
*2046	13,316		1,044	10,150	2,122	
3028	33,174		2,427	9,247	21,500	
Subtotal	422,874		30,877	209,672	182,325	
Grant County						
1004	3,745		92	1,269	2,384	
1007[d]	10,634		0	6,191	4,443	
*1011	1,981		0	509	1,472	
1022-1513[c]	3,270		0	274	2,996	
1023	2,895		0	12	2,883	
1036	2,510		0	461	2,049	
1039	9,597		0	3,338	6,259	
1045	965		0	473	492	
1046	4,399		0	4,251	148	
1047	14,735		0	9,083	5,652	
1051[b]	72		0	0	72	
*2010	8,086		875	6,219	992	
*2011	13,575	1,893	0	11,493	189	

APPENDIX F-6 (continued)

Allotment Number	Public Land Acres	Ecological Condition Class (acres) Excellent	Good	Fair	Poor	Waste Acres
		Category I (continued)				
Grant County (continued)						
2023[b]	37,029		13,960	23,069	0	
2044	16,627		0	16,605	22	
4528	3,839		0	0	3,839	
Subtotal	133,959	1,893	14,927	83,247	33,892	
3-COUNTY CATEGORY I TOTAL	1,120,827	1,893	72,296	613,427	428,008	5,203
		Category M				
Hidalgo County						
1002	937		0	595	342	
1005-1541[c]	735		29	582	124	
1010	10,699		141	10,330	228	
1018	3,023		0	2,485	538	
1019[b]	1,614		0	1,613	1	
1021	2,837		0	2,726	111	
1024	7,104		193	6,911	0	
1029	1,023		0	1,011	12	
1031	231		0	231	0	
1033	3,120		0	3,120	0	
1050[b]	2,418		2,260	0	158	
1052	4,160		1,755	2,318	87	
1053	3,301		0	2,285	1,016	
1056	4,193		0	3,273	920	
1058-1546[c]	1,977		54	1,920	3	
1060[b]	4,840		542	3,298	1,000	
1061	1,936		0	1,768	168	
1062	11,266		753	10,053	460	
1064	369		0	369	0	
1077	338		32	306	0	
1079	1,559		0	1,517	0	42
1080	71		0	71	0	
2016	6,647		0	6,247	400	
2024[b]	8,352		0	6,161	2,191	
Subtotal	82,750		5,759	69,190	7,759	42

APPENDIX F-6 (continued)

Allotment Number	Public Land Acres	Ecological Condition Class (acres)				Waste Acres
		Excellent	Good	Fair	Poor	
			Category M (continued)			
Luna County						
2005	4,162		1,139	3,002	21	
2006	45,601		260	41,425	3,916	
2012	2,730		709	2,021	0	
2528	718		85	633	0	
2020-2533[c]	2,829		104	2,489	236	
2026	2,407		0	2,213	194	
2038	15,515		3,209	8,268	4,038	
Subtotal	73,962		5,506	60,051	8,405	
Grant County						
1051[b]	4,072		1,862	0	2,210	
2023[b]	79,304		1,816	73,545	3,943	
2050	1,830		449	1,048	333	
Subtotal	85,206		4,127	74,593	6,486	
3-COUNTY CATEGORY M TOTAL	241,918		15,392	203,834	22,650	42
			Category C			
Hidalgo County						
1003	2,276		0	0	2,276	
1016[b]	2,551		0	37	2,514	
1028	2,605		0	12	2,593	
1035	2,423		20	2,207	196	
1038-1551[c]	3,774		0	1,883	1,891	
1042	4,765		100	3,545	1,120	
1043	477		0	41	436	
1065	806		0	55	751	
1068	11,851		238	8	4,535	7,070
1072	3,411		0	1,332	1,896	183
1074-1537[c]	1,180		29	53	1,098	
Subtotal	36,119		387	9,173	19,306	7,253

APPENDIX F-6 (concluded)

Allotment Number	Public Land Acres	Ecological Condition Class (acres)				Waste Acres
		Excellent	Good	Fair	Poor	
		Category C (continued)				
Luna County						
2003	10,468		0	1,825	8,643	
2007[b]	2,940		0	0	2,940	
2008[b]	4,631		0	72	4,559	
2028	1,766		0	246	1,520	
2041[b]	6,912		0	77	6,835	
2047	838		51	0	787	
2048	457		0	0	457	
2053(3016)	2,944		0	0	2,944	
Subtotal	30,956		51	2,220	28,685	
Grant County						
1049	193		0	0	193	
1075	1,098		0	326	772	
Subtotal	1,291		0	326	965	
3-COUNTY CATEGORY C TOTAL	68,366		438	11,719	48,956	7,253

Source: BLM Las Cruces District Office files, 1982.

Notes: *Indicates allotments with Allotment Management Plans.

a/Allotments not listed were not transected and have no ecological condition information. These allotments are in Category M. Acres used were calculated through the digitizing system and will not match case file acres (see Appendix B-2 for methodology on digitizing).

b/Indicates allotments in more than one category.

c/Allotments controlled by the same permittee and run as one grazing unit.

d/Part of Allotment 4501 is included within Allotment 1007.

APPENDIX G
WATER RESOURCES

APPENDIX G-1

METHODOLOGY - SURFACE RUNOFF

The method used to estimate surface runoff is from the Engineering Field Manual, Chapter 2, U.S. Department of Agriculture, Soil Conservation Service.

Determining volume or peak rate of surface runoff from regional areas is difficult to assess because of the many variables involved, such as the differences in topograpy, climate, soils, vegetative types, ground cover and stocking rates. When assessing the impacts of the Proposed Action and alternatives on surface runoff, several assumptions were made:

1. one square mile watersheds, dominated by one range site;
2. 10-year, 24 hour storm event;
3. average 10 percent slope on hilly sites;
4. average 5 percent slope on gravelly and gravelly loam sites;
5. level slopes on sandy and shallow sandy areas;
6. one dominant vegetation type for each range site;
7. existing and predicted ground cover taken from Appendix B-8 and Table 3-3.

APPENDIX G-2

WATER QUALITY CRITERIA
FOR LIVESTOCK AND WILDLIFE USE

Parameter	Recommended Upper Limit
Salinity	7,000 mg/l
Chloride	1,500 mg/l
Fluoride	2.0 mg/l
Sulfate	1,000 mg/l
Nitrate	100 mg/l
Nitrite	10 mg/l
Arsenic	0.2 mg/l
Boron	5 mg/l
Mercury	0.01 mg/l
Selenium	0.05 mg/l
Zinc	25 mg/l

Sources: Federal Water Pollution Control Administration, 1968.

Environmental Protection Agency, 1972.

APPENDIX G-3

STATE WATER QUALITY STANDARDS

RIO GRANDE BASIN

1. Includes the main stem of the Rio Grande from the International Boundary and Water Commission sampling station above American Dam at El Paso upstream to one mile below Percha Dam. Designated uses include: irrigation, limited warmwater fishery, livestock and wildlife watering, and secondary contact recreation.

Parameter	Standard
Dissolved Oxygen	> 5.0 mg/l
pH	6.6 to 8.8
Temperature	< 34^{O}C (93.2^{O}F)
Fecal Coliform	< 1,000/100 ml
TDS	< 2,000 mg/l
Sulfate	< 500 mg/l
Chlorides	< 400 mg/l
Discharge	350 c.f.s.

2. Includes the main stem of the Rio Grande from one mile below Percha Dam upstream to the headwaters of Caballo Reservoir including Caballo Reservoir. Designated uses include: irrigation, livestock and wildlife watering, primary contact recreation, and warmwater fishery.

Parameter	Standard
Dissolved Oxygen	> 5.0 mg/l
pH	6.0 to 9.0
Temperature	< 32.2^{O}C (90^{O}F)
Turbidity	< 50 FTU
Fecal Coliform	< 100/100 ml
Algae	free of concentrations which cause gastro-intestinal or skin disorders.

GILA RIVER BASIN

1. Includes the main stem of the Gila River from the New Mexico - Arizona line upstream to Redrock. Designated uses include: irrigation, limited warmwater fishery, livestock and wildlife watering, and secondary contact recreation.

Parameter	Standard
Dissolved Oxygen	> 5.0 mg/l
pH	6.6 to 8.8
Temperature	< 32.2°C (90°F)
Fecal Coliform	< 1,000/100 ml

2. Includes the main stem of the Gila River from Redrock upstream to Gila Hot Springs. Designated uses include: industrial water supply, irrigation, livestock and wildlife watering, marginal coldwater fishery, secondary contact recreation, and warmwater fishery.

Parameter	Standard
Dissolved Oxygen	> 5.0 mg/l
pH	6.6 to 8.8
Temperature	< 28°C (82.4°F)
Fecal Coliform	< 1,000/100 ml

MIMBRES RIVER BASIN

1. Includes the Mimbres River below Mimbres and all perennial reaches of tributaries thereto. Designated uses include: coldwater fishery, irrigation, livestock and wildlife watering, and secondary contact recreation.

Parameter	Standard
Dissolved Oxygen	> 6.0 mg/l
pH	6.6 to 8.8
Temperature	< 20°C (68°F)
Fecal Coliform	< 100/100 ml

2. Includes Mimbres River above Mimbres and all perennial tributaries thereto. Designated uses include: irrigation, domestic water supply, high quality coldwater fishery, livestock and wildlife watering, and secondary contact recreation.

APPENDIX G-3 (concluded)

Parameter	Standard
Ammonia as N	$<$ 0.02 mg/l
Conductivity	$<$ 300 umlos
Dissolved Oxygen	6.0 mg/l
Total Nitrogen	$<$ 1.0 mg/l
pH	$>$ 6.6 to 8.8
Temperature	$<$ 20°C (68°F)
Chlorine	$<$ 0.002 mg/l
Carbon	$<$ 7 mg/l
Total Phosphorus	$<$ 0.1 mg/l
Turbidity	$<$ 10 FTU
Fecal Coliform	$<$ 100/100 ml

Source: Water Quality Control Commission 81-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, June 4, 1981.

APPENDIX G-4

WATER QUALITY STANDARDS FOR GROUNDWATER OF 10,000 mg/l TDS CONCENTRATION OR LESS

A. Human Health Standards - Groundwater shall meet the standards of Section A and B unless otherwise provided.

Arsenic (As)	0.1 mg/l
Barium (Ba)	1.0 mg/l
Cadmium (Cd)	0.01 mg/l
Chromium (Cr)	0.05 mg/l
Cyanide (CN)	0.2 mg/l
Floride (F)	1.6 mg/l
Lead (Pb)	0.05 mg/l
Total Mercury (Hg)	0.002 mg/l
Nitrate (NO_3 as N)	10.0 mg/l
Selenium (Se)	0.05 mg/l
Silver (Ag)	0.05 mg/l
Uranium (U)	5.0 mg/l
Radioactivity: Combined Radium-226 and Radium-228	30.0 pCi/l
Benzene	0.01 mg/l
Polychlorinated biphenyls (PCBs)	0.001 mg/l
Toluene	15.0 mg/l
Carbon Tetrachloride	0.01 mg/l
1, 2-dichloroethane (EDC)	0.02 mg/l
1, 1-dichloreothylene (1, 1-DCE)	0.005 mg/l
1, 1, 2, 2-tetrachloroethylene (PCE)	0.02 mg/l
1, 1, 2-trichoroethylene (TCE)	0.1 mg/l

B. Other Standards for Domestic Water Supply

Chloride (Cl)	250. mg/l
Copper (Cu)	1.0 mg/l
Iron (Fe)	1.0 mg/l
Manganese (Mn)	0.2 mg/l
Phenols	0.005 mg/l
Sulfate (SO_4)	600 mg/l
Total Dissolved Solids (TDS)	1000. mg/l
Zinc (Zn)	10.0 mg/l
pH	between 6 and 9

C. Standards for Irrigation Use - Groundwater shall meet the standards of subsections A, B, and C unless otherwise provided.

Aluminum (Al)	5.0 mg/l
Boron (B)	0.75 mg/l
Cobalt (Co)	0.05 mg/l
Molybdenum (Mo)	1.0 mg/l
Nickel (Ni)	0.2 mg/l

Source: New Mexico Water Quality Control Commission Regulations as Amended Through January 29, 1982.

APPENDIX H
CULTURAL RESOURCES

APPENDIX H

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
District Office
P. O. Box 1420
Las Cruces, New Mexico
88004

IN REPLY REFER TO
8100

June 3, 1982

Mr. Thomas Merlan
New Mexico SHPO
505 Don Gaspar Ave.
Santa Fe, NM 87503

Dear Mr. Merlan:

Enclosed you will find a copy of the proposed Chapter 1 of Las Cruces/ Lordsburg Management Framework Plan (MFP) Amendment/EIS. As you can see, there have been very few numbers created for the various actions proposed; however, this draft will give you an idea of the activities planned. Of course we will keep you informed of the progress of the MFP update.

I would appreciate your comments and suggestions on this initial draft. While we do have a Class 1 Inventory in this District, we do not have a Class II Inventory of the MFP area, and there is no hope of getting one. In light of this what is your opinion of using existing survey data, especially from seismograph lines, and BLM range site data, to arrive at tentative high-low site density areas in some portions of the study area, in particular Dona Ana and parts of Luna County. This information will be used as a management tool to indicate areas where conflicts may arise. It will not be used to exclude some areas from survey if a surface-disturbing project is proposed in those areas.

Sincerely yours,

/s/ Donnie R. Sparks

Daniel C. B. Rathbun
District Manager

Enclosures

March 3, 1849

United States Department of the Interior

IN REPLY REFER TO
8100

BUREAU OF LAND MANAGEMENT
District Office
P. O. Box 1420
Las Cruces, New Mexico
88004

August 24, 1982

Mr. Thomas Merlan
New Mexico SHPO
505 Don Gaspar Avenue
Santa Fe, NM 87503

Dear ~~Mr. Merlan~~: Tom

Enclosed are a number of cultural resource survey reports, both BLM in-house and contract reports. They are as follows:

030-82-67	NMSU 508 Geothermal Well Pads
030-82-68	Rural Television System
030-82-69	El Paso Electric Line
030-82-70	Aguirre Spring Well Site
030-82-71	Crawford Boundary Fence
030-82-72	NMSU 514 Geophysical Services Line
030-82-76	Mountain View Water Line
030-82-77	Mountain Bell Buried Line
030-82-79	NMSU 501 Geophysical Services Line
030-82-84	Isaacks Troughs

Also I am enclosing a number of site reports. Please feel free to comment on the reports and site forms.

In a telephone conversation several weeks ago, you indicated that a formal consultation on the Las Cruces/Lordsburg MFP Amendment we are currently writing will not be required. This was because of the state of the cultural data and the requirement that all surface-disturbing projects will be surveyed and cultural resources located will be avoided or mitigated. I would appreciate it if you could write us a letter to the effect that a formal consultation will not be required for inclusion in the document.

Sincerely yours,

Dan Rathbun

Daniel C. B. Rathbun
District Manager

Enclosures

STATE OF NEW MEXICO

DEPARTMENT OF
FINANCE AND ADMINISTRATION

STATE PLANNING DIVISION

BRUCE KING
GOVERNOR

KATHLEEN R. MARR
SECRETARY

505 DON GASPAR AVENUE
SANTA FE, NEW MEXICO 87503
(505) 827-2073
(505) 827-5191
(505) 827-2108

ANITA HISENBERG
DIRECTOR

JOE GUILLEN
DEPUTY DIRECTOR

August 26, 1982

Daniel C. B. Rathbun
District Manager
Bureau of Land Management
P. O. Box 1420
Las Cruces, New Mexico 88004

Dear Mr. Rathbun:

Thank you for your letter of August 24, 1982 enclosing various recent cultural resource survey reports.

Reports Nos. 030-82-68, 69, 78 and 84 are negative, and do not require consultation under our existing memorandum of agreement.

Reports Nos. 030-82-67, 030-82-70, 030-82-71, 030-82-72 and 030-82-79 recommend clearance based on avoidance of identified sites. In the last case, clearance is not recommended for the area around NMSU 1206. No further consultation is required on these undertakings, provided that identified sites are avoided as stipulated. I would appreciate a follow-up letter explaining how the matter of NMSU 1206 is to be dealt with.

The isolated flake recorded in Report No. 030-82-76 does not, in my opinion, meet any established criterion of significance. No further consultation is necessary.

Report 030-82-77 refers to mitigation of adverse effect on a Site 2998. Did we consult on this case? Such consultation is called for by our procedural memorandum of agreement (Section VIII). I would appreciate further information.

This letter will also confirm my earlier statement that in my opinion no formal consultation on the proposed amendment to the Las Cruces-Lordsburg Management Framework Plan is required. My opinion is based on the understanding that the areas of effect of all undertakings with the potential to disturb the cultural or natural environment which are carried out under the Plan will be surveyed, and that where cultural resources are located, we will proceed to consult on the questions of eligibility and effect as usual.

APPENDIX H (concluded)

Daniel C. B. Rathbun
August 26, 1982
Page Two.

Thank you for your continuing cooperation.

Sincerely,

Thomas W. Merlan
State Historic Preservation Officer
Historic Preservation Bureau

TWM:jmg

APPENDIX I
VISUAL RESOURCES

APPENDIX I-1

VISUAL RESOURCES INVENTORY AND EVALUATION PROCESS

The BLM's Visual Resource Management (VRM) program functions in two ways. First, all public land is inventoried and the visual resources evaluated. The end result is the identification of VRM classes. Second, the program provides the framework for evaluation of proposed projects relative to their anticipated impact on the visual resource. The contrast rating system is used to make this evaluation.

Inventory

Evaluation of the scenic quality of a landscape, the visual sensitivity of that landscape to change, and the distance of the landscape from a viewer determines the final VRM class. A discussion of each aspect of this evaluation follows.

Scenic Quality

Perhaps scenic quality is best described as the overall impression one retains after driving through or walking through an area. During the inventory, an area is divided into units which are primarily homogeneous in terms of landforms, vegetation, and structures. Each of these units are then evaluated in terms of seven key factors (landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications). Rating scores are assigned to each factor according to uniform criteria. The sum of the rating scores are translated into three scenic quality classes: A, B, or C.

Visual Sensitivity

Sensitivity of the landscape is measured in terms of the degree of concern expressed by the public toward scenic quality. A matrix combines user attitude and use volume to an overall rating of high, medium or low sensitivity.

Distance Zones

Distance zones are determined in the field by traveling along each major route and observing the area that can be viewed. The areas are defined as the foreground/middle ground, background, or seldom seen.

Management Classes

VRM classes describe the different degree of modification allowed in the basic elements of the landscape. These classes are determined through a matrix which combines scenic quality, visual sensitivity, and distance zones. The resulting classes are mapped and become the basis used to assess the impact of proposed activities. Map 2-8 illustrates the final classes and describes the degree of modification allowed in each class.

Contrast Rating System

The degree to which a proposed project affects the visual quality of the landscape depends on the amount of visual contrast that is created between the activity and the existing landscape. The contrast rating system is used to assess this contrast.

The system reduces a landscape to its major features (land and water, vegetation, and structures) and each feature into its basic elements (form, line, color, and texture). The predicted contrast of the proposal against each landscape feature then indicates the total anticipated visual impact.

For each management class, there are maximum acceptable ratings for each element and any one feature.

Conclusion

Using this system, the predicted impacts of each proposal are anticipated and extreme visual contrasts are mitigated during the planning and design stage. For a more thorough discussion of the Visual Resource Management procedures, see BLM Manual, Sections 8411 and 8431.

APPENDIX J
RECREATION

APPENDIX J-1

METHODOLOGY FOR DETERMINING HUNTER VISITOR HOURS

Current deer hunting visitor hours are projected by using the following method. The projected hunter days are multiplied by the percent of deer hunter pressure on public land and the percent of the 3-County Area public land within the deer management unit or deer herd unit. The resulting figure is the projected hunter days attributable to public land in the 3-County Area. Hunter days are calendar days spent hunting. A visitor day is participation in a recreation activity by one or more individuals aggregating a total of 12 hours of use. A deer hunting day is estimated to be 1.5 visitor days. To project visitor days attributable to the BLM which occur in the 3-County Area, the projected hunter days attributal to public land in the 3-County Area are multiplied by 1.5. Visitor days are converted to visitor hours by multiplying by 12. Table J-1, Current Deer Hunting Visitor Hours, contains the figures used in this analysis.

Deer hunting visitor hours are projected for the various alternatives using the following method. At present, 80,340 deer hunting visitor hours are occurring on public land within the 3-County Area. These hunters are pursuing a deer population of 1,768. This figure represents the present population of 1,226 deer in the established deer population areas plus 542 deer which are scattered throughout the 3-County Area. Dividing hunting visitor hours by the deer population results in 45 visitor hours for each deer. Assuming this amount of hunting pressure continues, future visitor hours are projected by multiplying 45 by the projected deer population.

	Projected Deer Population	Projected Hunter Visitor Hours
Proposed Action	3,057	137,565
No Action Alternative	1,768	79,560
Elimination of Livestock Grazing Alternative	3,407	153,315
Maximization of Livestock Forage Production Alternative	3,057	137,565
Enhancement of Other Resource Values Alternative	3,057	137,565

TABLE J-1

CURRENT DEER HUNTING VISITOR HOURS - LUNA, GRANT AND HIDALGO COUNTIES

Deer a/ Herd Unit	Deer b/ Management Unit	Projected c/ Hunter Days	BLM acres a/ of Occupied Deer Range Within Deer Management Units	Percent of Deer Hunter Pressure on BLM Land	3-County a/ Area BLM Acres of Occupied Deer Range Within Deer Management Units	Percent of 3-County Area BLM Land within Deer Management Unit	Projected Hunter Days Attributable to 3-County Area BLM Land	Projected Visitor Days Attributable to 3-County Area BLM Land	Projected Visitor Hours Attributable to 3-County Area BLM Land
Gila (GDH)	#23	17,701	4,480	10%	4,480	100%	1,770	2,655	31,860
	#24	4,084	12,160	5%	12,160	100%	204	306	3,672
Deming (DDH)	#25	2,412	92,160	80%	67,840	74%	1,428	2,142	25,704
Lordsburg (LDH)	#26	1,247							
	#27	1,405							
	TOTAL	2,652	204,447	40%	204,447	100%	1,061	1,592	19,104
TOTAL							4,463	6,695	80,340

Sources and Notes:
a/ See Map 2-1 Big Game Population Areas.
b/ Proclamation Big Game, Turkey and Furbearer Seasons. New Mexico April 1, 1981 through March 31, 1982.
c/ New Mexico Department of Game and Fish, "Summary and Analysis of Deer Hunter Survey, July 6, 1982 and "1981 Deer Bow/Muzzle Loader Survey".
d/ New Mexico Department of Game and Fish, Comprehensive Plan (1978).
e/ A visitor hour is participation in a recreation activity by one or more individuals aggregating a total of 60 minutes of use.

APPENDIX K
ECONOMIC CONDITIONS

APPENDIX K-1

METHODOLOGY - LAS CRUCES/LORDSBURG INPUT-OUTPUT MODEL

The Las Cruces/Lordsburg Input-Output Model was prepared by Regional Analytics, Santa Barbara, California, under contract with the Bureau of Land Management. The following discussion is a summation of the methodology used by Regional Analytics. The details of the methodology used is contained in Technical Report X, which is available for review at the Las Cruces District Office. The study area contains the entire Las Cruces/Lordsburg Resource Area in southwestern New Mexico which includes Dona Ana, Grant, Hidalgo and Luna Counties.

Regional Analytics used five steps in creating the regional input-output transactions table. The first step begins with converting the national input-output table from a commodity-by-industry format, in which it is originally published, to an industry-by-industry form required for regionalization. This conversion is needed because the regionalization is accomplished using regional employment data which are collected and reported on an industry, rather than commodity basis. The second step is the collection of employment data using published sources. The third step involves using the regional employment estimates to calculate location quotients, and with these location quotients, to scale down the national table to a regional table. The fourth step is the estimation of coefficients for special sectors that cannot be estimated from the national table directly. The fifth step involves calculating the transactions table, and balancing it.

APPENDIX K-2

METHODOLOGY FOR DEVELOPING RANCH BUDGETS FOR THE 3-COUNTY AREA

The ranch budgets used for the Las Cruces/Lordsburg (LC/L) Management Framework Plan Amendment/Environmental Impact Statement were developed using secondary data from the Bureau of Land Management (BLM), Las Cruces District Office allotment case files and from the New Mexico State University (NMSU) Agricultural Experiment Station Bulletin 684, "Organization, Costs and Returns of Cattle Ranches in Southwestern New Mexico 1979".

The total operation for each livestock operator was estimated by grouping the animal unit months (AUMs) by allotment for each operator in the 3-County Area. The 5-year average was used for BLM AUMs since it was determined this best represented the operator's actual operation. It was assumed that the AUMs for state and private lands as shown in the allotment case files were indicative of the actual operation. The total AUMs were then converted into animal units. The operations were classified into different ranch sizes according to the number of animal units (AUs). The different categories were Subsistence 1-69 AUs, Small 70-199 AUs, Medium 200-499 AUs, Large 500+ AUs. After the operations were categorized, the average number of AUs for each ranch size was calculated by dividing the number of AUs by the number of operators. Those operators who had Section 15 leases only were excluded from the totals since there was insufficient information to determine the total operation.

The ranch budget for the LC/L Subsistence size operation with an average of 44 AUs and 27 operators, was estimated by calculating the percentage difference in average AUs between the West Socorro Subsistence operation and the West Socorro Small operation. The percentage difference was then applied to the LC/L Small operation individual budget items to derive the budget items for the LC/L Subsistence size operation. It was assumed that the percentage difference between the West Socorro Subsistence and Small operation would be similar to the percentage difference between the LC/L Subsistence and Small operation.

The ranch budget for the LC/L Small commercial operation with an average of 124 AUs and 25 operators, was estimated by calculating the percentage difference in average AUs between the 1980 NMSU medium operation and the 1979 NMSU Medium operation. The percentage difference was then applied to the 1979 NMSU Small operation average AUs to derive a 1980 adjusted average AU for the NMSU Small operation. The LC/L Small operation average AU is divided by the 1980 adjusted average AU for the NMSU Small operation. The percentage difference is then applied to the 1979 NMSU Small operation individual budget items to derive the 1980 LC/L Small operation individual budget items.

The ranch budget for the LC/L Medium commercial operation with an average of 277 AUs and 27 operators, was estimated by calculating the

APPENDIX K-2 (concluded)

percentage difference in average AUs between the 1980 NMSU medium operation and the 1980 LC/L medium operation. The percentage difference is then applied to the 1980 NMSU medium operation individual budget items and the results are used for the 1980 LC/L medium operation individual budget items.

The ranch budget for the LC/L Large commercial operation with an average of 1,272 AUs and 16 operators, was estimated by calculating the percentage difference in average AUs between the 1980 NMSU Extra Large operation and the 1980 LC/L Large operation. The percentage difference is then applied to the 1980 NMSU Extra large operation individual budget items and the results are used for the 1980 LC/L Large operation.

The detailed calculations for individual budget items for each ranch size are contained in Technical Report X, which is available for review in the Las Cruces District Office.

APPENDIX K-3

ESTIMATED COSTS AND RETURNS FOR INDIVIDUAL RANCH SIZE CATEGORIES IN THE 3-COUNTY AREA

Note: Technical Report X contains the detailed methodology for developing ranch budgets for each ranch size category.

SUBSISTENCE SIZE OPERATION[a/]
1-69 AUs (44 Avg. AUs) - 27 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT) [b/]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Cows	6	8.57	$41.27		$ 2,122.10
Yearling Heifers	2	5.58	57.26		639.02
Yearling Steers	2	6.20	64.87		804.39
Heifer Calves	8	4.32	68.79		2,377.38
Steer Calves	15	4.37	73.73		4,833.00
Bulls	1	13.00	40.07		520.91
Subtotal	34				$11,296.80
Non-Cash Receipts					
Livestock Inventory Change					
Cows	1			$487.00	$ 487.00
Yearling Heifers	1			423.00	423.00
Yearling Steers	1			453.00	453.00
Heifer Calves	-5			358.00	-1,790.00
Steer Calves	-3			401.00	-1,203.00
Subtotal	-5				$-1,630.00
TOTAL RECEIPTS					$ 9,666.80

APPENDIX K-3 (continued)

SUBSISTENCE SIZE OPERATIONS

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repair and Maintenance	Depreciation	Total
Costs							
Feed							
Hay	(tons)	7	$ 511.00				$ 511.00
Grain	(CWT)	3.55	36.49				36.49
Protein Concentrate 41%	(CWT)	88.52	1,188.00				1,188.00
Salt and Minerals	(CWT)	7.5	59.40				59.40
Subtotal			$1,794.89				$1,794.89
Leases and Grazing Fees							
BLM	(AUMs)	286	$675.38				$675.38
State	(acres)	996	288.84				288.84
Subtotal			$964.22				$964.22
Livestock Expenses							
Veterinarian and Medical	(head)	55	$ 172.15				$ 172.15
Bulls	(head)	1	1,080.02				1,080.02
Subtotal			$1,252.17				$1,252.17
Labor (hired)							
Daily			$20.68				$20.68
Other							
Electricity	(mkh)	21	$ 130.83				$ 130.83
Telephone	(months)	12	124.92				124.92
Butane and Heating	(gallons)	80	48.00				48.00
Insurance	(number)	1	227.04				227.04
Miscellaneous	(head)	55	409.75				409.75
Property Tax (land)	(acres)	986	261.29				261.29
Property Tax (livestock)	(head)	55	24.20				24.20
Subtotal			$1,226.03				$1,226.03
Machinery and Equipment							
Auto (ranch share)	(miles)	2,467		$ 298.51		$ 493.40	$ 791.91
Pickup	(miles)	5,581		932.03		496.71	1,428.74
Tractors	(hours)	86		282.94		147.06	430.00
Other Equipment	(dollars)	1,677				216.33	216.33
Subtotal				$1,513.48		$1,353.50	$2,866.98
Improvements							
House (ranch share)	(number)	1			$ 149.90	$ 633.65	$ 783.55
Service Buidlings	(number)	1			171.57	218.77	390.34
Fences	(miles)	9			405.36	558.90	964.26
Corrals	(number)	2			124.62	41.62	166.24
Wells	(number)	2			191.58	782.54	974.12
Tanks	(number)	3			93.96	337.14	431.10
Pipelines	(number)	2			66.42	220.46	286.88
Subtotal					$1,203.41	$2,793.08	$3,996.49
TOTAL COSTS			$5,257.99	$1,513.48	$1,203.41	$4,146.58	$12,121.46
Returns to operator, labor, management, and capital							$-2,454.66

LIVESTOCK INVENTORY FOR SUBSISTENCE RANCHING OPERATION 1980

Class	Beginning	Purchase	Born	Sold	Died	Used	End
Cows - Beef	33	0	0	6	0	0	34
Heifers 1-2	7	0	0	2	0	0	8
Steers 1-2	0	0	0	2	0	0	1
Heifer Calves	10*	0	13	8	0	0	5*
Steer Calves	3*	0	15	15	0	0	0*
Bulls	2	1	0	1	0	0	2
Total Cattle	55	1	28	34	0	0	50
Cattle AU	42						45
Horses	1						1
Horses AU	1						1
Total AU[c]	43						46

Notes: a/Average herd size 44 cows, 70 percent calf crop based on January 1 bred cow inventory with fall pregnancy test, 20 cows per bull, forage dependancy on BLM land in the Las Cruces/Lordsburg Resource Area 65 percent, deeded range 24 percent, state land 11 percent, real estate is valued on an AU basis.

b/CWT = 100 weight.

c/Calculation of average AU = 43 + 46 = 89 ÷ 2 = 44.5 or 44 average AU.

*Does not count against BLM AUs.

APPENDIX K-3 (continued)

SMALL COMMERCIAL COW-CALF OPERATION[a/]
70-199 AUs (124 Avg. AUs) - 25 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT)[b/]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Cattle					
Cows	21	8.57	$41.27		$ 7,427.36
Yearling Heifers 1-2	6	5.85	57.26		2,009.83
Yearling Steers 1-2	15	6.20	64.87		6,032.91
Heifer Calves	19	4.32	68.79		5,646.28
Steer Calves	35	4.37	73.73		11,277.00
Bull	1	13.00	40.07		520.91
Subtotal	97				$32,914.29
Non-Cash Receipts					
Livestock Inventory Change					
Cows	-9			$487.00	$-4,383.00
Yearling Heifers 1-2	3			423.00	1,269.00
Yearling Steers 1-2	1			453.00	453.00
Heifer Cows	-3			358.00	-1,074.00
Steer Calves	-10			401.00	-4,010.00
Bulls	0			910.00	-0-
Subtotal	-18				$-7,745.00
TOTAL RECEIPTS					$25,169.29

APPENDIX K-3 (continued)

SMALL COMMERCIAL COW-CALF OPERATION

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repair and Maintenance	Depreciation	Total
Costs							
Feed							
Hay	(tons)	20	$1,460.00				$1,460.00
Grain	(CWT)	10	102.80				102.80
Protein Concentrate 41%	(CWT)	82	1,100.44				1,100.44
Salt and Minerals	(CWT)	21	166.32				166.32
Subtotal			$2,829.56				$2,829.56
Leases and Grazing Fees							
BLM	(AUMs)	830	$1,960.03				$1,960.03
State	(acres)	1,561	452.69				452.69
Private	(acres)	1,319	514.41				514.41
Subtotal			$2,927.13				$2,927.13
Livestock Expenses							
Veterinarian and Medicine	(head)	158	$ 300.20				$ 300.20
Bulls	(head)	1	1,080.02				1,080.02
Subtotal			$1,380.22				$1,380.22
Labor (Hired)							
Daily	(days)	36	$900.00				$900.00
Other							
Electricity	(mkh)	58	$ 361.34				$ 361.34
Telephone	(months)	12	351.96				351.96
Butane and Heating	(gallons)	225	135.00				135.00
Insurance	(number)	1	666.66				666.66
Miscellaneous	(head)	158	1,177.10				1,177.10
Property Tax (land)	(acres)	2,185	579.02				579.02
Property Tax (livestock)	(head)	158	69.52				69.52
Subtotal			$3,340.60				$3,340.60
Machinery and Equipment							
Auto (ranch share)	(miles)	4,480		$ 542.08		$ 896.00	$1,438.08
Pickup	(miles)	10,200		1,703.40		907.80	2,611.20
Tractors	(hours)	150		493.50		256.50	750.00
Other Equipment	(dollars)	4,725				609.53	609.53
Subtotal				$2,738.98		$2,669.83	$5,408.81
Improvements							
House (ranch share)	(number)	1			$ 149.90	$ 633.65	$ 783.55
Service Buildings	(number)	1			171.57	218.77	390.34
Fences	(miles)	17			765.68	1,055.70	1,821.38
Corrals	(number)	3			186.93	312.18	499.11
Wells	(number)	3			287.37	1,173.81	1,461.18
Tanks	(number)	6			187.92	674.28	862.20
Pipelines	(number)	2			66.42	220.46	286.88
Subtotal					$1,815.79	$4,288.85	$6,104.64
TOTAL COSTS			$11,377.51	$2,738.98	$1,815.79	$6,958.68	$22,890.96
Returns to operator, labor, management, and capital							$2,278.33

APPENDIX K-3 (continued)

LIVESTOCK INVENTORY FOR SMALL COMMERCIAL COW-CALF OPERATION 1980

Class	Beginning	Purchase	Born	Sold	Died	Used	End
Cows - Beef	97	0	0	21	1	0	88
Heifers 1-2	13	0	0	6	0	0	16
Steers 1-2	2	0	0	15	0	0	3
Heifer Calves*	22*	0	39*	19	1	0	19*
Steer Calves*	16*	0	42*	35	1	0	6*
Bulls	8	1	0	1	0	0	8
Total Cattle	158	1	81	97	3	0	140
Cattle AU	120						115
Horses	6						6
Horses AU	6						6
Total AU[c]	126						121

Notes: a/Average herd size 124 cows, 74 percent calf crop based in January 1 bred cow inventory with fall pregnancy test, 2.5 percent calf loss birth to weaning, 1 percent annual cow loss, 12 percent replacement rate, 14 cows per bull, forage dependancy on BLM land in the Las Cruces/Lordsburg Resource Area 61 percent, deeded range 26 percent, state land 13 percent, real estate is valued on an AU basis.

b/CWT = 100 weight.

c/Calculation of average AU = 126 + 121 = 247 ÷ 2 = 123.5 or 124 average AU.

*Does not count against BLM AUs.

APPENDIX K-3 (continued)

MEDIUM COMMERCIAL COW-CALF OPERATION[a/]
200-499 AUs (277 Avg. AUs) - 27 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT) [b/]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Cattle					
Cows	41	8.9	$41.27		$15,059.42
Yearling Heifers	3	6.3	57.26		1,082.21
Yearling Steers	21	6.6	64.87		8,990.98
Heifer Calves	71	4.3	68.79		21,001.59
Steer Calves	92	4.6	73.73		31,202.54
Bulls	3	13.5	40.07		1,622.84
Subtotal	231				$78,959.58
Non-Cash Receipts					
Livestock Inventory Change					
Cows	-23			$487.00	$-11,201.00
Yearling Heifers	5			423.00	2,115.00
Yearling Steers	1			453.00	453.00
Heifer Calves	-4			358.00	-1,432.00
Steer Calves	-14			401.00	-5,614.00
Bulls	-2			910.00	-1,820.00
Subtotal	-37				$-17,499.00
Livestock Perquisites					
Yearling Heifers	1	6.3	57.26		$360.74
Yearling Steers	1	6.6	64.87		428.14
Subtotal	2				$788.88
TOTAL RECEIPTS					$62,249.46

APPENDIX K-3 (continued)

MEDIUM COMMERCIAL COW-CALF OPERATION

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repair and Maintenance	Depreciation	Total
Costs							
Feed							
Hay	(tons)	24	$1,752.00				$1,752.00
Grain	(CWT)	90	700.00				700.00
Protein Concentrate 41%	(CWT)	212	2,828.08				2,828.08
Salt and Minerals	(CWT)	121	958.32				958.32
Subtotal			$6,238.40				$6,238.40
Leases and Grazing Fees							
BLM	(AUMs)	2,099	$4,953.64				$4,953.64
State	(acres)	5,236	1,518.44				1,518.44
Subtotal			$6,472.08				$6,472.08
Livestock Expenses							
Veterinarian and Medicine	(head)	334	$ 591.18				$ 591.18
Bulls	(head)	1	1,080.00				1,080.00
Subtotal			$1,671.18				$1,671.18
Labor (hired)							
Daily	(days)	115	$2,875.00				$2,875.00
Other							
Electricity	(mkh)	87	$ 542.01				$ 542.01
Telephone	(months)	12	411.60				411.60
Butane and Heating	(gallons)	399	239.40				239.40
Insurance	(number)	1	1,220.00				1,220.00
Miscellaneous	(head)	334	1,359.38				1,359.38
Property Tax (land)	(acres)	3,393	872.05				872.05
Property Tax (livestock)	(head)	334	159.32				159.32
Subtotal			$4,803.76				$4,803.76
Machinery and Equipment							
Auto (ranch share)	(miles)	7,370		$1,009.69		$1,134.98	$ 2,144.67
Pickup	(miles)	29,882		5,229.35		2,480.20	7,709.55
Tractors	(hours)	275		910.25		510.65	1,420.90
Other Equipment	(dollars)	7,397		1,094.76		954.21	2,048.97
Subtotal				$8,244.05		$5,080.04	$13,324.09
Improvements							
House (ranch share)	(number)	1			$ 135.41	$ 623.75	$ 759.16
Service Buildings	(number)	2			282.62	520.00	802.62
Fences	(miles)	45.6			1,487.02	2,668.45	4,155.47
Corrals	(number)	5			275.25	804.00	1,079.25
Wells	(number)	7			749.42	2,689.38	3,438.80
Tanks	(number)	16			357.12	1,736.64	2,093.76
Pipelines	(number)	5			141.50	455.60	597.10
Subtotal					$3,428.34	$9,497.82	$12,926.16
TOTAL COSTS			$22,060.42	$8,244.05	$3,428.34	$14,577.86	$48,310.67
Returns to operator, labor, management, and capital							$13,938.79

APPENDIX K-3 (continued)

LIVESTOCK INVENTORY FOR MEDIUM COMMERCIAL COW-CALF OPERATION 1980

Class	Beginning	Purchase	Born	Sold	Died	Used	End
Cow - Beef	237	0	0	41	3	0	214
Heifers 1-2	21	0	0	3	1	1	26
Steers 1-2	3	0	0	21	0	1	4
Heifers Calves*	31*	0	99*	71	1	0	27*
Steer Calves*	23*	0	104*	92	3	0	9*
Bulls	19	1	0	3	0	0	17
Total Cattle	334	1	203	231	8	2	297
Cattle AU	280						261
Horses	7						7
Horses AU	7						7
Total AU[c/]	287						268

Notes: a/Average herd size 277 cows, 78.7 percent calf crop based on January 1 bred cow inventory with fall pregnancy test, 2 percent calf loss birth to weaning, 1.5 percent annual cow loss, 13 cows per bull, forage dependency on BLM land in the Las Cruces/Lordsburg Resource Area 67 percent, deeded range 14 percent, state land 19 percent, real estate is valued on an AU basis.

b/CWT = 100 weight.

c/Calculation of average AU = 287 + 268 = 555 ÷ 2 = 277.5 or 277 average AU.

*Does not count against BLM AUs.

APPENDIX K-3 (continued)

LARGE COMMERCIAL COW-CALF OPERATION[a]
500+ AUs (1,272 Avg. AUs) - 16 Operators

Estimated Receipts

Item	Number per Ranch	Average Weight (CWT) [b]	Price per CWT	Value per Head	Receipts
Cash Receipts					
Cattle					
Cows	235	9.50	$41.27		$ 92,135.28
Yearling Heifers	187	6.05	57.26		64,781.10
Yearling Steers	355	6.33	64.87		145,772.62
Heifer Calves	156	4.41	68.79		47,324.77
Steer Calves	193	4.52	73.73		64,319.10
Bulls	11	14.41	40.07		6,351.50
Subtotal	1,137				$420,684.37
Non-Cash Receipts					
Livestock Inventory Change					
Cows	-96			$487.00	$-46,752.00
Yearling Heifers	-10			423.00	-4,230.00
Yearling Steers	-41			453.00	-18,573.00
Heifer Calves	-31			358.00	-11,098.00
Steer Calves	-30			401.00	-12,030.00
Bulls	-2			910.00	-1,820.00
Subtotal	-210				$-94,503.00
Livestock Perquisites					
Yearling Heifers	3	6.05	57.26		$1,039.27
Yearling Steers	1	6.33	64.87		410.63
Subtotal	4				$1,449.90
TOTAL RECEIPTS					$327,631.27

APPENDIX K-3 (continued)

LARGE COMMERCIAL COW-CALF OPERATION

Estimated Costs

Item	Unit	Quantity	Purchased Inputs	Fuel and Repairs	Repair and Maintenance	Depreciation	Total
Costs							
Feed							
Hay	(tons)	39	$ 2,847.00				$ 2,847.00
Protein Concentrate 41%	(CWT)	786	9,463.44				9,463.44
Salt and Minerals	(CWT)	286	2,265.12				2,265.12
Subtotal			$14,575.56				14,575.56
Leases and Grazing Fees							
BLM	(AUMs)	8,087	$19,085.32				$19,085.32
State	(acres)	22,026	6,387.54				6,387.54
Subtotal			$25,472.86				$25,472.86
Livestock Expenses							
Veterinarian and Medicine	(head)	1,982	$ 3,607.24				$ 3,607.24
Bulls	(head)	10	11,500.00				11,500.00
Subtotal			$15,107.24				$15,107.24
Labor (hired)							
Annual	(months)	24	$18,480.00				$18,480.00
Other							
Electricity	(mkh)	402	$ 2,504.46				$ 2,504.46
Telephone	(months)	12	939.12				939.12
Butane and Heating	(gallons)	1,620	972.00				972.00
Insurance	(number)	1	6,557.00				6,557.00
Miscellaneous	(head)	1,982	7,928.00				7,928.00
Property Tax (land)	(acres)	22,103	4,995.28				4,995.28
Property Tax (livestock)	(head)	1,982	973.16				973.16
Subtotal			$24,869.02				$24,869.02
Machinery and Equipment							
Auto (ranch share)	(miles)	13,124		$ 1,614.25		$ 2,309.82	$ 3,924.07
Pickup	(miles)	67,840		10,786.56		6,512.64	17,299.20
Trucks	(miles)	7,913		2,959.46		775.47	3,734.93
Tractors	(hours)	299		995.67		460.46	1,456.13
Other Equipment	(dollars)	10,190		1,508.12		1,314.51	2,822.63
Contract Work	(dollars)	1,737		5,384.70			5,384.70
Subtotal				$23,248.76		$11,372.90	$34,621.66
Improvements							
House (ranch share)	(number)	4			$ 680.05	$ 3,700.00	$ 4,380.05
Service Buildings	(number)	3			473.88	1,044.00	1,517.88
Fences	(miles)	84			2,372.16	5,015.64	7,387.80
Corrals	(number)	9			632.97	2,183.94	2,816.91
Wells	(number)	21			1,745.10	8,959.86	10,704.96
Tanks	(number)	30			727.20	3,540.00	4,267.20
Pipelines	(number)	18			318.60	1,125.00	1,443.60
Subtotal					$6,949.96	$25,568.44	$32,518.40
TOTAL COSTS			$98,504.68	$23,248.76	$6,949.96	$36,941.34	$165,644.74
Returns to operator, labor, management, and capital							$161,986.53

APPENDIX K-3 (concluded)

LIVESTOCK INVENTORY FOR LARGE COMMERCIAL COW-CALF OPERATION 1980

Class	Beginning	Purchase	Born	Sold	Died	Used	End
Cows - Beef	1,006	0	0	235	17	0	910
Heifers 1-2	156	0	0	187	4	3	146
Steers 1-2	87	0	0	355	4	1	46
Heifer Calves	340*	0	472	156	7	0	309*
Steer Calves	319*	0	490	193	8	0	289*
Bulls	74	10	0	11	1	0	72
Total Cattle	1,982	10	962	1,137	41	4	1,772
Cattle AU	1,323						1,174
Horses	23						23
Horses AU	23						23
Total AUs[c/]	1,346						1,197

Notes: a/Average herd size 1,272 cows, 83 percent calf crop based on January 1 bred cow inventory with fall pregnancy test, 1.5 percent calf loss birth to weaning, 1.8 percent annual cow loss, 16 cows per bull, forage dependency on BLM land in the Las Cruces/Lordsburg Resource Area 57 percent, deeded range 24 percent, state land 19 percent, real estate is valued on an AU basis.

b/CWT = 100 weight.

c/Calculation of average AU = 1,346 + 1,197 = 2,543 ÷ 2 = 1,271.5 or 1,272 average AU.

*Does not count against BLM AUs.

APPENDIX K-4

ESTIMATED COSTS AND RETURNS FOR RANCH SIZE CATEGORIES BY ALTERNATIVE IN THE 3-COUNTY AREA

SUBSISTENCE (1-69 AUs)

Item	Existing	Proposed Action		No Action		Maximization of Livestock Forage Production		Enhancement of Other Resource Values		Elimination of Livestock Grazing
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	
Total Receipts	$ 9,667	$ 9,012	$ 9,671	$ 9,667	$9,667	$ 9,012	$11,302	$ 7,162	$ 9,378	$ 3,663
Variable Cash Costs	7,183	6,639	7,125	7,183	7,183	6,639	8,326	5,276	6,909	2,699
Return Above Variable Cash Costs	2,484	2,373	2,546	2,484	2,484	2,373	2,976	1,886	2,469	964
Fixed Costs[a]	792	792	792	792	792	792	792	792	792	792
Depreciation[a]	4,147	4,147	4,147	4,147	4,147	4,147	4,147	4,147	4,147	4,147
Return to Operator, Labor, Management, Capital	$-2,455	$-2,566	$-2,393	$-2,455	$-2,455	$-2,566	$-1,963	$-3,053	$-2,470	$-3,975
Head										
Average Herd Size	44	41	44	44	44	41	51	33	43	17

SMALL (70-199 AUs)

Item	Existing	Proposed Action		No Action		Maximization of Livestock Forage Production		Enhancement of Other Resource Values		Elimination of Livestock Grazing
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	
Total Receipts	$25,169	$24,577	$28,129	$25,169	$25,169	$24,577	$30,582	$19,706	$25,237	$10,859
Variable Cash Costs	13,838	13,557	15,516	13,838	13,838	13,557	16,869	10,870	13,921	5,990
Return Above Variable Cash Costs	11,331	11,020	12,613	11,331	11,331	11,020	13,713	8,836	11,316	4,869
Fixed Costs[a]	2,094	2,094	2,094	2,094	2,094	2,094	2,094	2,094	2,094	2,094
Depreciation[a]	6,959	6,959	6,959	6,959	6,959	6,959	6,959	6,959	6,959	6,959
Return to Operator, Labor, Management, Capital	$2,278	$1,967	$3,560	$2,278	$2,278	1,967	$4,660	$ -217	$ 2,263	$-4,184
Head										
Average Herd Size	124	121	139	124	124	121	151	97	124	54

MEDIUM (200-499 AUs)

Item	Existing	Proposed Action		No Action		Maximization of Livestock Forage Production		Enhancement of Other Resource Values		Elimination of Livestock Grazing
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	
Total Receipts	$62,249	$59,347	$68,317	$62,249	$62,249	$59,347	$76,426	$45,170	$62,680	$22,941
Variable Cash Costs	30,448	28,988	33,369	30,448	30,448	28,988	37,330	22,063	30,616	11,205
Return Above Variable Cash Costs	31,801	30,359	34,948	31,801	31,801	30,359	39,096	23,107	32,064	11,736
Fixed Costs[a]	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285	3,285
Depreciation[a]	14,578	14,578	14,578	14,578	14,578	14,578	14,578	14,578	14,578	14,578
Return to Operator, Labor, Management, Capital	$13,938	$12,496	$17,085	$13,938	$13,938	$12,496	$21,233	$ 5,244	$14,201	$-6,127
Head										
Average Herd Size	277	264	304	277	277	264	340	201	279	102

LARGE (500+ AUs)

Item	Existing	Proposed Action		No Action		Maximization of Livestock Forage Production		Enhancement of Other Resource Values		Elimination of Livestock Grazing
		Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	
Total Receipts	$327,631	$315,958	$341,452	$327,631	$327,631	$315,958	$375,386	$272,401	$324,935	$154,016
Variable Cash Costs	112,736	108,731	117,504	112,736	112,736	108,731	129,182	93,741	111,820	53,002
Return Above Variable Cash Costs	214,895	207,227	223,948	214,895	214,895	207,227	246,204	178,660	213,115	101,014
Fixed Costs[a]	15,968	15,968	15,968	15,968	15,968	15,968	15,968	15,968	15,968	15,968
Depreciation[a]	36,941	36,941	36,941	36,941	36,941	36,941	36,941	36,941	36,941	36,941
Return to Operator, Labor, Management, Capital	$161,986	$154,318	$171,039	$161,986	$161,986	$154,318	$193,295	$125,751	$160,206	$ 48,105
Head										
Average Herd Size	1,272	1,226	1,325	1,272	1,272	1,226	1,456	1,057	1,261	598

Source: BLM Las Cruces District Office Files, 1982.
Note: a/Fixed Costs and Depreciation are assumed to remain constant.

APPENDIX K-5

LINEAR ANALYSIS METHODOLOGY

A linear program model was used to estimate the economic changes the ranch budgets for each size category would experience due to the adjustment in animal unit months (AUMs) under each alternative. The Bureau of Land Management, Las Cruces District Office has a computer program on file called Mathematical Programming System (MPS). This program can be used to either maximize profits or minimize costs for each ranch size category. The analysis used for this study was to maximize profits.

A data file for each ranch size category was developed by estimating the objective function, price per pound of livestock by class, AUM cost, AUM requirement per brood animal unit (BAU) for each class of livestock by season, average weight per BAU for each class of livestock, and the Right Hand Side (RHS) constraint.

The following discussion is the methodology used to estimate the data file inputs. The objective function was estimated by calculating the total variable costs and dividing the total by the BAU requirement. The BAU requirement was estimated by adding the beginning inventory AUs for brood cows to the ending inventory AUs for brood cows and dividing by 2. This determines the average BAU requirement. The price per pound of livestock by class was determined by using the 1980 NMSU prices. The different classes of livestock used were heifer calves, steer calves, yearlings, and culls. The price per pound for yearlings was estimated by combining the prices for yearling heifers and yearling steers and deriving an average price per pound for yearlings. The price per pound for culls was estimated by combining the prices for cull cows and bull culls and deriving an average price per pound for culls.

The AUM cost was determined by dividing the total cost of AUMs by the total AUM requirement.

The AUM requirement per BAU for each class of livestock by season was estimated by using the beginning inventory animal units for spring and summer. The AUM requirement per BAU for each class of livestock for fall and winter was estimated by using the ending inventory animal units. Since yearlong grazing is predominant in the 3-County Area it was assumed that the animal unit requirement in the fall and winter would be less than the spring and summer, because livestock are normally marketed from October to December. The animal units for each class of livestock for each season were multiplied by a factor of 3 AUMs to estimate the total AUM requirement for each class of livestock by season. The factor of 3 AUMs was calculated by dividing the AUM requirement per AU (12 AUMs) by the four seasons. The total AUM requirement for each class of livestock by season was then divided by the BAU requirement to determine the AUM requirement per BAU for each class of livestock by season.

The average weight per BAU for each class of livestock was estimated by dividing the total weight for each class of livestock by the BAU requirement.

The RHS constraint was estimated by using the AUMs available for livestock grazing for each ranch size category.

In order to perform linear analysis, data files for each ranch size category were developed by estimating the above mentioned inputs for the 1980 existing situation and input to the Las Cruces District Office computer terminal. When performing linear analysis for each ranch size category under each alternative, the RHS constraint for the existing situation was adjusted by the amount of AUMs available for the alternative.

The MPS program calculates the L-value which is the total returns above variable costs. The returns to operator, labor, management, and capital are calculated by subtracting fixed costs and depreciation from the returns above variable costs.

The detailed calculations used to develop data files for each ranch size category and the returns to operator, labor, management, and capital for each alternative are contained in Technical Report X, which is available for review in the Las Cruces District Office.

GLOSSARY

GLOSSARY

ACRE-FOOT. The amount of water it would take to cover one acre of land to a depth of one foot; 325,851 gallons; 43,560 cubic feet.

ADJUSTMENTS IN NUMBERS. Change (increase or decrease) of livestock numbers to conform to the amount of forage produced in an area considering other multiple uses.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLOTMENT MANAGEMENT PLAN (AMP). A documented program which applies to livestock operations on public land, prepared in consultation with the permittee(s) or lessee(s) involved, and which : (1) prescribes the manner in and extent to which livestock operations will be conducted in order to meet the multiple-use, sustained-yield, economic, and other needs and objectives as determined for the public land through land use planning; and (2) describes the type, location, ownership, and general specifications for the rangeland improvements to be installed and maintained on the public land to meet the livestock grazing and other objectives of land management; and (3) contains such other provisions relating to livestock grazing and other objectives as may be prescribed by the authorized officer consistent with applicable law.

ALLUVIAL. Pertaining to alluvium; deposited by a stream of running water.

ALLUVIAL FAN. A fan-shaped accumulation of disintegrated soil material; water deposited and located in a position where the water departs from a steep course to enter upon a flat plain or open valley bottom.

ALLUVIUM. A general term for clay, silt, sand, gravel, or similar unconsolidated sediments deposited by a stream or other body of running water.

ANDESITE. A volcanic rock composed essentially of andesine and one or more mafic constituents. The mafic constituents may be pyroxene, hornblende, or biotite.

ANIMAL UNIT (AU). Considered to be one mature (1,000 lbs.) cow or its equivalent based upon average daily forage consumption of 26 pounds of dry matter per day.

ANIMAL UNIT MONTH (AUM). The amount of food or forage required by an animal-unit for one month.

ANNUAL PLANT SPECIES. A plant that completes its life cycle and dies in 1 year or less.

APPARENT TREND. The direction of change in rangeland condition over time.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Areas within the public land where special management attention is needed to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

ASPECT SPECIES. The vegetative species that appear as the dominant vegetative subtype. The appearance of a dominant or most common species of vegetation given to the viewer, i.e., shortgrass, pinyon-juniper, creosote.

AVIFAUNA. All birds of a given region.

BASALT. A dark to medium-dark colored commonly extrusive mafic igneous rock.

BASE WATER. Water that is suitable for consumption by livestock and is available and accessible to authorized livestock on public land used for livestock grazing.

BASIN AND RANGE. Topography characterized by a series of tilted fault block mountain ranges and broad intervening basins.

BASIN AND RANGE PHYSIOGRAPHIC PROVINCE. A province in the southwestern United States characterized by a series of tilted fault blocks forming longitudinal ridges or mountains and broad intervening basins.

BIOACCUMULATION. The uptake of substances from the environment, other than food. Generally, the uptake of environmental pollutants.

BIOMASS. The total quantity of living organisms of one or more species per unit of space (called species biomass) or of all the species in a community (called community biomass).

BOLSON. A flat-floored desert valley that drains to a playa.

BROWSE. (noun) That part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption. (verb) To consume browse.

BUREAU SENSITIVE. Fish, wildlife, and plants which are candidates for Federal listing or species proposed for Federal listing automatically become Bureau Sensitive.

CALCAREOUS. Having significant accumulation of calcium carbonate ($CaCO_3$) to produce a pH of over 7.0 and would effervesce visibly when treated with cold dilute hydrochloric acid (HCl).

CALF CROP. The number of calves weaned from a given number of cows bred, usually expressed in percentages.

CALICHE. A layer in the soil more or less cemented by calcium carbonates ($CaCO_3$), commonly found in arid and semi-arid regions.

CAMPSITE. A cultural site type representative of all periods consisting of temporary habitation areas containing a lithic scatter, often evidence of fire use, and usually ground stone and often a pottery scatter.

CARBON MONOXIDE. A colorless, tasteless, and odorless gas produced primarily from incomplete combustion of fossil fuels used in vehicles, industries, and space heating.

CARRYING CAPACITY. Maximum stocking rate possible without inducing damage to vegetation or related resources. It may vary from year-to-year on the same area due to fluctuating weather conditions and forage production. (See Grazing Capacity.)

CHIHUAHUAN DESERT SHRUBS. Shrubs characteristic of the Chihuahuan desert such as creosote, tarbush, tobosa, burro grass, and mesquite.

CINDER CONE. A conical hill formed by volcanic activity with the accumulation of cinders and other ejecta.

CLIMAX VEGETATION COMMUNITY. The vegetation community which emerges after a series of successive vegetational stages and perpetuates itself indefinitely unless disturbed by outside forces.

CLOSED BASIN. A basin is considered closed with respect to surface flow if its topography prevents the occurrence of visible outflow. It is closed hydrologically if neither surface nor underground outflow can occur.

COARSE TEXTURED SOIL. A soil consisting of mostly large particles. It includes sands, loamy sands, and sandy loams (See Soil Texture).

CONTRAST RATINGS. A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature.

CONTROLLED LANDS. Private or state lands within an allotment which are owned or leased by the permittee.

COOL SEASON PLANT SPECIES. A plant that does most of its growing during the early spring and late fall and can set seed at either time.

COOPERATIVE AGREEMENT. Agreement whereby the permittee agrees to provide funds for construction and maintenance of a rangeland development.

COW YEARLONG (CYL). The amount of forage necessary to sustain one cow for a 1-year period. One CYL equals 12 AUMs.

CRITICAL MINERALS. Those minerals that are critical to the economy and security of the United States and for which we are now dependent on unreliable foreign sources. These minerals are listed in the National Defense Stockpile Inventory of Strategic and Critical Materials.

CULTURAL RESOURCE INVENTORY CLASSES. Class I - Existing data inventory: an inventory study of a defined area designed to provide a narrative overview (cultural resource overview) derived from existing cultural resource information and to provide a compilation of existing cultural resource site record data on which to base the development of the BLM's site record system.

Class II - Sampling field inventory: a sample-oriented field inventory designed to locate and record from surface and exposed profile indications all cultural resource sites within a portion of a defined area in a manner which will allow an objective estimate of the nature and distribution of cultural resources in the entire defined area. The Class II inventory is a tool utilized in management and planning activities as an accurate predictor of cultural resources in the area of consideration. The primary area of consideration for the implementation of a Class II inventory is a planning unit. The secondary area is a specific project in which an intensive field inventory (Class III) is not practical or necessary.

Class III - Intensive field inventory: an intensive field inventory designed to locate and record from surface and exposed profile indications all cultural resource sites within a specified area. Normally, upon completion of such inventories in an area, no further cultural resource inventory work is needed. A Class III inventory is appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

DEFERRED ROTATION GRAZING. Discontinuance of grazing on various parts of a range in succeeding years, allowing each part to rest successively during the growing season to permit seed production, establishment of seedlings, or restoration of plant vigor. At least two, but usually three or more separate units are required.

DESIRABLE FORAGE PLANT. Plants which are palatable and productive forage species, generally dominant under climax or near climax conditions, long-lived, and have deep fibrous roots to protect the watershed against erosion.

DIRECT IMPACT. Income, employment, or population changes for individual economic sectors, such as range livestock production, resulting from permitted grazing level adjustments and oil and gas and geothermal actions.

DIRT TANK. Usually a permanent earthern structure for holding water temporarily. These are built in high rainfall runoff areas such as an arroyo, canyon, or swale area.

DISCHARGE. Rate of flow at a given instant in terms of volume per unit of time; pumping discharge equals pumping rate, usually given in gallons per minute (gpm); stream discharge, usually given in cubic feet per second (cfs).

DIVERSITY. The relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

DIVERSITY INDEX. A number that indicates the relative degree of diversity in habitat per unit area.

DRAINAGE BASIN. A part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded water.

ECOLOGICAL CONDITION. The present composition of the vegetation on a range site in relation to the climax (natural potential) plant community for that site. Four ecological condition classes are used to indicate the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site.

Ecological Condition Class	Percentage of present plant community that is climax for the range site
Excellent	76 - 100
Good	51 - 75
Fair	26 - 50
Poor	0 - 25

ECOSYSTEM. An interacting natural system including all the component organisms together with the abiotic (non-living) environment.

ENDANGERED SPECIES. Federally listed - Any species or plant in danger of extinction throughout all or a significant portion of its range.

State (Group I) - Species whose prospect of survival or recruitment in the state are in jeopardy in the foreseeable future.

State (Group II) - Species whose prospect of survival or recruitment within the state may become jeopardized in the foreseeable future.

ENVIRONMENTAL ASSESSMENT (EA). (a) A concise public document for which a Federal agency is responsible that serves to: (1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; (2) Aid an agency's compliance with the National Environmental Protection Agency (NEPA) when no environmental impact statement is necessary; (3) Facilitate preparation of a statement when one is necessary. (b) Includes brief discussions of the need for the proposal, of alternatives as required by Sec. 102 (2)(D) of NEPA, of the environmental impacts of the proposed action and other alternatives, and a listing of agencies and persons consulted.

EPHEMERAL STREAM. A stream or portion of a stream which flows only in direct response to precipitation. Such flow is usually of short duration.

ESOPHAGEAL FISTULATED ANIMAL. An animal used for dietary studies specifically to determine plant preferences. An opening is made in the animal's esophogus to take direct samples.

EROSION DIKE. Usually one large earthern, rock, wire, cement, etc. structure used to break and hold large concentrated flows of water and release this water in small non-eroding amounts.

EXTRUSIVE ROCK. Rocks derived from magma poured out or ejected at the earth's surface.

FAULT. A fracture in the earth's crust accompanied by a displacement of one side with respect to the other.

FAULT BLOCK. A block of the earth's crust bounded on at least two opposite sides by faults; it may be elevated or depressed relative to the adjoining region.

FECAL ANALYSIS. A technique for determining diet by microscopic examination of fecal material.

FINE TEXTURED SOIL. A soil consisting of large quantities of the fine fractions. It includes clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay, and clay textured classes (See Soil Texture).

FORAGE ALLOCATION. The amount of or percentage of the total forage produced, which is designated for a particular use such as livestock grazing, wildlife, or watershed protection.

FORAGE (COMPETITIVE). Plants which are used as food by large herbivores, such as cattle, and by large and small wildlife.

FORAGE VALUE CLASS. Is based on the percent of desirable forage species present (quality and quantity) for livestock and the existing erosion condition of the site. Existing forage value class is determined by direct field examination.

Good forage value class - Rangeland is in good condition when plant composition is 40 percent or more of both desirable and intermediate species. At least 20 percent of the composition is made up of desirable species. Species composition was determined by using pace-point transect procedures.

Fair forage value class - Rangeland is in fair condition when the plant composition is 15 to 39 percent of desirable and intermediate species. At least 5 or more percent of the composition is made up of desirable species. Fair ratings are also applied when the composition comprises 60 percent or more of intermediate species and less than 5 percent desirable species. Composition by species were determined by pace-point transect procedures.

Poor forage value class - Rangeland is in poor condition if the plant composition is less than 15 percent desirable and intermediate species.

FORB. Any herbaceous non-woody plant that is not a grass or grass-like plant.

FORMATION. The primary unit of formal mapping or description. Most formations possess certain distinctive or combination of distinctive lithic features. Boundaries are not based on time criteria. Formations may be combined into groups or subdivided into members.

GEOPHYSICAL EXPLORATION. The use of geophysical instruments and methods to determine subsurface conditions by analysis of such properties as specific gravity, electrical conductivity, or magnetic susceptibility. This usually has an economic objective, e.g. discovery of fuel or mineral deposits.

GEOTHERMAL ENERGY. Useful energy that can be extracted from naturally occurring steam, hot water, or hot rock in the earth's crust.

GRAZING CAPACITY. The maximum livestock stocking rate possible without inducing damage to vegetation or related resources such as watershed. This incorporates factors such as suitability of the rangeland for grazing as well as the proper use which can be made on all of the plants within the area. Normally expressed in terms of acres per animal unit month (AC/AUM) or sometimes referred to as the total AUMs that are available in any given area such as an allotment. Areas that are unsuitable for livestock use are not computed in the grazing capacity. Grazing capacity may or may not be the same as the stocking rate.

GRAZING DISTRICT (BOUNDARY). Is the specific area within which the public lands are administered under Section 3 of the Taylor Grazing Act. Public lands outside grazing district boundaries are administered under Section 15 of the Taylor Grazing Act.

GRAZING LEASE. A document authorizing use of the public lands outside grazing districts for the purpose of grazing livestock under Section 15 of the Taylor Grazing Act.

GRAZING PERMIT. A document authorizing use of public land within a grazing district for the purpose of grazing livestock under Section 3 of the Taylor Grazing Act.

GRAZING PREFERENCE. The total number of animal unit months of livestock grazing on public land apportioned and attached to base property owned or controlled by a permittee or lessee.

GRAZING MANAGEMENT TREATMENT. Under a grazing system, grazing or resting a particular unit of land (usually a pasture) at particular times each year to attain specific vegetative goals.

HABITAT. An area where a plant or animal lives. (Sum total of environmental conditions in the area.)

HABITAT MANAGEMENT PLAN (HMP). A written and officially approved plan for a specific geographical area of public land which identifies wildlife habitat and related objectives, establishes the sequence of actions for achieving objectives, and outlines procedures for evaluating accomplishments.

HERD UNIT. Big game habitat within a defined geographical area designated by the New Mexico Department of Game and Fish for management purposes.

HISTORIC CULTURAL RESOURCES. Historic cultural resources include all mines, ranches, towns, resorts, railroads, trails, and other evidence of human use from the entrance of the Spanish to 1932.

HUNTER DAY. Calendar day spent hunting. It is assumed a hunter day equals 1.5 visitor days.

IGNEOUS ROCKS. Rocks formed by solidification of magma.

INPUT-OUTPUT MODEL. An economic model used to predict or stimulate the economy for the purpose of this study.

INTERIOR FENCE. Fences used to divide allotments into pastures or holding areas.

INTERMEDIATE FORAGE PLANT. Plants which are of secondary importance in the climax condition. They replace the desirable plants as condition deteriorates and replace the less desirable plants as conditions improve. They may be less palatable to grazing animals or be resistant to grazing use.

INTRUSIVE. Igneous rock formed by the emplacement of molten material in pre-existing rock.

INVENTORY UNIT (Wilderness). Areas or islands of public land indexed for easy reference at the start of the wilderness inventory. These units may or may not be roadless. A roadless determination requires more detailed field work.

KEY FORAGE SPECIES. Forage species whose use serves as an indicator of the degree of use of associated species.

KIND OF LIVESTOCK. Kinds of domestic livestock grazing on rangeland: cattle, horses, sheep, or goats, or a combination of these. May be broken down to greater detail such as cows with calves, yearlings, steers, ewes, ewes with lambs, etc.

LEAST DESIRABLE FORAGE PLANTS. Plants which are definitely the poorer species in a type of community and consist principally of invaders, noxious, or low-value forage plants.

LIFE ZONES. A classification of flora and fauna on the basis of elevation and latitude.

LITHIC SCATTER. A Prehistoric cultural site type where flakes, cores, and stone tools are located either through the manufacture or use of the tools.

LONG-TERM IMPACT. The time period assumed for analysis of impacts in this MFP Amendment/EIS. For the Energy Minerals issue, long-term impacts are those which occur between 1980 and 2010. For the Rangeland Management issue, long-term impacts are those that would still exist by the year 2010.

LOWER SONORAN LIFE ZONE. The life zone which extends from about 2,817 to 5,000 feet elevation. The major floral type is desert shrub.

MAJOR LAND RESOURCE AREA (MLRA). Large geographic areas of land characterized by particular patterns of soil, climate, water resources, and land use.

MALPAIS. A Spanish word meaning rough country underlain by dark basaltic lava.

MANAGEMENT FRAMEWORK PLAN (MFP). A planning decision document that establishes, for a given planning area, land use allocations, coordination guidelines for multiple use, and management objectives to be achieved for each class of land use or protection. BLM's land use plan. An MFP is prepared in three steps: (1) resource recommendations, (2) impact analysis and alternative development, and (3) decision making.

MEDIUM TEXTURED SOIL. Intermediate between fine textured and coarse textured soil. It includes very fine sandy loam, loam, silt loam, and silt. (See Soil Texture)

MELANISTIC. Any darkness of the skin, hair, or eyes resulting from high pigmentation.

METABOLITE. A metabolic waste that is usually more or less toxic to the organism producing it.

MOGOLLON. One of the three major cultural traditions in the southwest. It spans a time period of about 200 BC to AD 1200. In the Resource Area it is divided into the Mimbres and Jornada sequences which intermingle near the Dona Ana - Luna County line. Throughout its time span it is characterized by increasingly complex agricultural practices and habitation patterns as well as increasing trade with other regions.

MULTIPLIER. The way in which an increase or decrease in new capital formation can cause cumulative effects in an economy through consumer expenditures.

NON-CASH RECEIPTS. Number changes in a herd from January 1 to December 31 by age, sex and type of livestock, multiplied by the ending inventory values per head. (Definition from Organization Costs and Returns of Cattle Ranches in Southwestern New Mexico, 1979. New Mexico State University, Agricultural Experiment Station, Bulletin 684.)

OFF-ROAD VEHICLE (ORV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

OPTIMUM NUMBERS (BIG GAME). A reasonable number of supportable animals, under multiple use, with proper habitat management and improvement.

ORDER 3 LEVEL SURVEY. Soil surveys are of Order 1 (detailed) to Order 5 (very broad). An Order 3 survey is displayed on maps with scales from 1:24,000 to 1:250,000. The soil surveys used as reference for this EIS were approximately 1:63,360 or one inch to the mile.

PACE POINT TRANSECTS. A method of estimating the vegetative ground cover which occurs on a predetermined transect line. A notch 1/8 inch wide and 1/16 inch deep is made on the sole of the toe of the boot. As that toe touches the ground, whatever is under or above the notch is recorded, i.e., live vegetation (species), litter (dead vegetative matter), rock and bare ground.

PALATABILITY. The relish with which a particular plant species or part is consumed by an animal. The palatability of a plant is usually related to its ecological significance as far as succession is concerned. Highly palatable plants are usually those which are a desirable species and decrease with increasing grazing pressures. Conversely, a low palatability usually characterizes a species which is least desirable and which increases with increasing grazing pressure.

PEDIMENT. A broad gentle sloping bedrock surface that is situated at the foot of a much steeper mountain slope in an arid or semi-arid region.

PERENNIAL PLANT SPECIES. A plant that has a life cycle of 3 or more years.

PERENNIAL STREAM. A stream or portion of a stream which flows continuously.

PERIOD OF USE. The times of the year when domestic animals would be allowed to graze on a specific unit of rangeland, as designated by license.

pH. The negative logarithm of the effective hydrogen-ion concentration or hydrogen-ion activity (in gram equivalents per liter) used in expressing both acidity and alkalinity on a scale whose values run from 0 to 14. Seven representing neutrality, numbers less than 7 increasing acidity, and numbers greater than 7 increasing alkalinity.

PHENOLOGY. The study of periodic biological phenomena such as initiation of growth, vegetative state, flowering, seeding, and dormancy, usually in relation to precipitation.

PHOTOSENSITIVITY BREAKDOWN TIME. The time required for a substance to be chemically reduced under the influence of sunlight.

PLANT COMMUNITY. One or more plant species growing in association on a given location or area.

PLAYA. The usually dry and nearly level lake plain that occupies the lowest parts of closed depressions.

POTTERY SCATTER. A Mogollon to Historic cultural site type where potsherds are concentrated, usually a small site.

PREFERENCE. See Grazing Preference.

PSEUDORIPARIAN AREAS. Intermittent drainages (arroyos) supporting a more varied vegetative composition than the surrounding upland areas.

QUARRY. A Prehistoric cultural site type containing materials used in the manufacture of stone tools. All steps in the manufacture of tools from natural rock to finished tools are present.

RANCH LIVESTOCK INDUSTRY. Ranch operations that are dependent on BLM rangeland within the Resource Area economy.

RANGE BETTERMENT FUND. The separate account in the National Treasury established by Section 401(b)(1) of the Federal Land Policy and Management Act of 1976, consisting of 50 percentum of all monies received by the United States as fees for grazing livestock on public land.

RANGELAND. Land on which the vegetation is predominantly grasses, grass-like plants, forbs, or shrubs usually suitable for grazing or browsing use.

RANGELAND CONDITION. See Ecological Condition.

RANGELAND DEVELOPMENT. Any activity or program on or relating to rangelands which is designed to control patterns of use, provide water, and stabilize soil and water conditions.

RANGELAND TREATMENTS. Any activity or program on or relating to rangelands which is designed to improve production of forage, change vegetative composition, and provide habitat for livestock or wildlife.

RANGE SITE. Rangeland that differs in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differ from other range sites in the kind or proportion of species or total production. (SCS 1976)

RAPTOR. Any predatory bird (such as a falcon, hawk, eagle, or owl) that has feet with sharp talons or claws adapted for seizing prey and a hooked beak for tearing flesh.

REST ROTATION GRAZING SYSTEM. A grazing system providing for systematic and sequential grazing by livestock and resting from livestock use on a rangeland area to provide for the production of livestock while simultaneously maintaining or improving the vegetation and soil fertility.

RHIZOME. A below ground root-like stem, horizontal in position, which produces roots below and sends up shoots developing into a new plant.

RHYOLITE. The extrusive equivalent of granite.

RIFT. A rift or rift zone usually refers to a system of fractures (faults) in the earth's crust and the associated valley or depression.

RIPARIAN VEGETATION. Vegetation which occurs in or adjacent to drainage ways or their flood plains.

ROCK ART (PETROGLYPH OR PICTOGRAPH). An Archaic to Modern cultural site type consisting of incised figures such as people, animals, plants, or abstracts on a rock surface.

ROCK SHELTER. A cultural site type representative of all periods consisting of an area protected by overhanging cliff. Often associated with the same materials as a campsite or rock art.

SEDIMENTARY ROCKS. Rocks formed by the consolidation of loose sediment that has accumulated in layers. Sedimentary is one of the three main classes into which all rocks are divided.

SHORT-TERM IMPACT. The time period assumed for analysis of impacts in this MFP Amendment/EIS. For the Energy Minerals issue, short-term impacts are those which occur from 1980 to 1994. For the Rangeland Management issue, short-term impacts are those which occur within 9 years (1985-1994) after implementation.

SITE WRITE-UP AREA (SWA). Small delineated geographical unit used as a base for collecting vegetation data. It may consist of an entire range site or portion of a unit. It may contain more than one present or potential plant community where soil-vegetation complexes occur that cannot be delineated.

SOIL INFILTRATION. The downward entry of water into the soil.

SOIL SERIES. A group of soils having genetic horizons (layers) that, except for texture of the surface layer, have similar characteristics and arrangement in the profile.

SOIL TEXTURE. The relative proportions of sand, silt, and clay in a soil as described by classes of soil texture. Soil textural classes recognized are:

sand
loamy sand
sandy loam
loam
silt loam
silt
sandy clay loam
clay loam
silty clay loam
sandy clay
silty clay
clay

Modifiers placed on textural classes when appropriate are:

gravelly
very gravelly
cobbly
very cobbly
stony
very stony

SOLITUDE. Outstanding opportunities for solitude or primitive and unconfined recreation are wilderness characteristics examined in the intensive wilderness inventory. Factors contributing to opportunities for solitide are vegetative screening, topographic relief, vistas, and physiographic variety. 1. The state of being along or remote from habitations; isolation. 2. A lonely, unfrequented, or secluded place.

SPECIAL CONCERN ELEMENT. Plant species considered rare and endangered by the New Mexico Heritage Program, but not legislatively protected.

STOCKING RATE. The area of land that a livestock operator has allowed to each animal unit for the entire grazing period of the year. May be expressed as a ratio such as AU/Section, acres/AU, or Acres/AUM.

STOLON. An above ground branch, runner, or prostrate stem which takes root at the tip and eventually develops into a new plant.

STORAGE TANK. Usually are open top permanent water holding structures used to supply water to troughs, pipelines, etc.

STRUCTURAL DIVERSITY (VERTICAL DIVERSITY). The diversity in an area that results from the complexity of the above ground structure of the vegetation, i.e., the more tiers of vegetation or the more diverse the species makeup or both, the higher the degree of vertical diversity.

SULFUR DIOXIDE (SO_2). A colorless, nonflammable, odiferous gas with corrosive qualities. High concentrations are found near copper smelters and industries burning fossil fuels containing sulfur.

SUSPENDED PREFERENCE. That portion of a grazing preference which has been suspended and for which active grazing use will not be reauthorized until forage is available and allocated for livestock grazing use on a sustained yield basis.

THREATENED SPECIES. Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.

TRANSECT. The area on which inventory data is gathered such as along a line, at points along a line, or over an area of a designated width and length.

TRANSITION ZONE The life zone which extends from about 7,000 to 9,500 feet elevation. The major floral type is ponderosa pine.

UNALLOTTED LANDS. Lands which currently are not committed to livestock grazing use.

UNCONTROLLED LANDS. Private or state lands within an allotment that are not owned or leased by the permittee.

UPPER SONORAN. The life zone which extends from about 4,500 to 8,000 feet elevation. The major floral type is pinyon-juniper.

USEABLE FORAGE. That forage which is available for allocation to livestock and wildlife after the proper use factors for key forage species on specific range sites has been reached.

UTILIZATION. The proportion of a year's forage production that is consumed or destroyed by grazing animals, usually expressed as a percentage. Percentage breakdowns are slight 0-20%, light 21-40%, moderate 41-60%, heavy 61-80%, and severe 81-100%.

VEGETATION COMPOSITION. The proportion of the total vegetation cover or weight provided by each species, expressed in percent.

VEGETATIVE SUBTYPE. See Aspect Species.

VEGETATION TREATMENTS. Methods used to control the growth and spread of undesirable vegetation. Control can be by chemical or mechanical means or by fire.

VILLAGE. A Mogollon to Historic cultural site type consisting of a permanent habitation area containing several types of artifacts, evidence of agriculture and structures.

VISITOR HOUR. The presence of a person on a recreation area or site for the purpose of engaging in recreation activities during continuous, intermittent, or simultaneous periods of time aggregating 60 minutes.

VISUAL CONTRAST RATING. (See Contrast Rating).

VISUAL RESOURCES MANAGEMENT (VRM) CLASSES. Are based on relative visual ratings of inventoried lands. Each class describes the different degree of modification allowed to the basic elements of the landscape. The following are the minimum management objectives for each class.

Class I - Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to Visual ACECs, wilderness areas, wild and scenic rivers, and other similar situations.

Class II - Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen but should not attact attention.

Class III - Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape.

Class IV - Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the changes should repeat the basic element of the landscape.

VOLCANIC ROCK. An igneous rock resulting from volcanic action at or near the earth's surface.

WATER DEPLETION. Water supply consumptively used and no longer available as a water source.

WATER SPREADER. Usually several small earthen, rock, wire, etc. structures used to break the flow of water and give the runoff a chance to be absorbed by the soils and plants.

WARM SEASON PLANT SPECIES. A plant that does most of its growing during the spring and summer and sets seed in the late summer or early fall. It is normally dormant in winter.

WILDERNESS. The definition contained in Section 2(c) of the Wilderness Act of 1964 is as follows: "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. Wilderness is an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

WILDERNESS CHARACTERISTICS. Those characteristics of wilderness as described in Section 2(c) of the Wilderness Act. These include size, naturalness, solitude, primitive and unconfined type of recreation, and supplemental values.

WILDERNESS REVIEW. The term used to cover the entire wilderness inventory study, and reporting phases of the wilderness program of the BLM.

WILDERNESS STUDY. The process of analyzing and planning wilderness preservation opportunities along with other resource opportunities within the BLM's planning system.

WORST CASE. Since the exact livestock allocation at the end of the monitoring period is unknown, the worst case analysis assumes a certain reduction in AUMs for each alternative as the maximum forseeable reduction.

YEARLING. An animal approximately 1 year of age. A short yearling is from 9 to 12 months of age and a long yearling is from 12 to 18 months.

YEARLONG GRAZING. Continuous grazing for a calendar year.

ACRONYMS AND ABBREVIATIONS

ac	acre
Ac/AUM	Acres per Animal Unit Month
ACEC	Area of Critical Environmental Concern
ac-ft	acre foot
ACHP	Advisory Council on Historic Preservation
ADC	Animal Damage Control
AGFD	Arizona Game and Fish Department
AUM	Animal Unit Month
AMP	Allotment Management Plan
BIA	Bureau of Indian Affairs
bmp	best management practices
C&MU	Classification and Multiple Use Act
DEIS	Draft Environmental Impact Statement
EA	Environmental Assessment
EID	Environmental Improvement Division

ACRONYMS AND ABBREVIATIONS (concluded)

EIS	Environmental Impact Statement
ELG	Elimination of Livestock Grazing Alternative
EORV	Enhancement of Other Resource Values Alternative
FLPMA	Federal Land Policy and Management Act
FWS	U.S. Fish and Wildlife Service
HMP	Habitat Management Plan
IBLA	Interior Board of Land Appeals
IMP	Interim Management Policy and Guidelines for Lands Under Wilderness Review
ISA	Instant Study Area
KGRA	Known Geothermal Resource Area
LCLRA	Las Cruces/Lordsburg Resource Area
NA	No Action Alternative
NASA	National Aeronautics and Space Administration
NMDGF	New Mexico Department of Game and Fish
NMSO	New Mexico State Office (BLM)
NMSU	New Mexico State University
NNL	National Natural Landmark
NOI	Notice of Intent to Conduct Geophysical Exploration
NOL	Not Open to Leasing
NSO	No Surface Occupancy
MAX	Maximization of Energy Minerals Leasing and Livestock Forage Production Alternative
MFP	Management Framework Plan
mg/l	milligrams per liter
MLRA	Major Land Resource Area
MMS	Minerals Management Service
MOU	Memorandum of Understanding
OMRL	Organ Mountain Recreation Lands
ONA	Outstanding Natural Area
ORV	Off-road vehicle
PA	Proposed Action
PMOA	Programmatic Memorandum of Agreement
PS	Protective Stipulation
SCS	Soil Conservation Service
SHF	Standard Habitat Feature
SHPO	State Historic Preservation Office
SHS	Standard Habitat Site
SRG/MFP	Southern Rio Grande/Management Framework Plan
SWA	Site Writeup Area
TDS	Total Dissolved Solids
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
WEG	Wind Erodability Group
WPS	Wilderness Protection Stipulation
WSA	Wilderness Study Area
WSMR	White Sands Missile Range

REFERNCES

REFERENCES

Altom, J. D., and Stritzke, J. F. "Degradation of Dicamba, Picloram and Four Phenoxy Herbicides in Soils." Weed Science, 21 (1973): 556-560.

American Farm Bureau Federation, The. Scientific Dispute Resolution Conference on 2,4,5-T. Richmond, Illinois: NU VVE Printing, 1979.

Anderson, A. E.; Snyder, W. A.; and Brown, G. W. "Stomach Content Analyses Related to Condition in Mule Deer, Guadalupe Mountains, New Mexico." Journal of Wildlife Management, 29 (1965): 352-366.

Anthony, R. G., and Smith, N. S. "Ecological Relationships Between Mule Deer and White-Tailed Deer in Southeastern Arizona." Ecol. Monographs, 47(3) (1977): 255-277.

Applegarth, J. S.; Bednarz, J. C.; and Williamson, M. A. "The Ridge-Nosed Rattlesnake in New Mexico: A Review of Existing Information and a Search for Suitable Habitat on Public Lands." (Contract NM-910-CTO-9) Las Cruces, New Mexico: BLM Las Cruces District Office, September 30, 1980.

Arizona Interagency Range Committee, 1973. Grazing Systems for Arizona Ranges. Washington, D.C.: Government Printing Office, 1974.

Baur, J. R. "Effects of Picloram and Tebuthiuron on Establishment of Ryegrass Winter Pasture." Journal of Range Management, 31(6) (1978): 450-455.

Baur, J. R.; Bovey, R. W.; and McCall, H. G. "Thermal and Ultraviolet Loss of Herbicides." Pesticide Abstract, 8(4) (1974): 217.

Bavin, B. Post-Release Study of Desert Bighorn Sheep in the Big Hatchet Mountains, New Mexico. Las Cruces, New Mexico: New Mexico Department of Game and Fish, 1982.

Beck, R. F. New Mexico State University. Vegetation Response to Decreased Cattle Use and Little or No Brush Control. (telephone conversation) Bea Wade, EIS Team Range Conservationist, BLM Las Cruces District Office, October 7, 1982.

Blydenstein, J.; Hungerford, C. R.; Day, G. I.; and Humphrey, R. R. "Effect of Domestic Livestock Exclusion on Vegetation in the Sonoran Desert." Ecology, 38(3) (1957): 522-526.

Bovey, R. W.; Burnett, E.; Meyer, R. E.; Richardson, C.; and Loh, A. Persistence of Tebuthiuron in Surface Runoff Water, Soil and Vegetation in the Texas Blackland Prairie. College Station, Texas: Texas Agricultural Experiment Station, Texas A&M University, 1980.

Bovey, R. W.; Burnett, E.; Richardson, C.; Merkle, M. G.; Baur, J. R.; and Knisel, W. G. "Occurrence of 2,4,5-T and Picloram in Subsurface Water in the Blacklands of Texas." Journal of Environmental Quality, 4 (1975): 103-106.

__________. "Occurrence of 2,4,5-T and Picloram in Surface Runoff Water in the Blacklands of Texas." *Journal of Environmental Quality*, 3 (1974): 61-64.

Bovey, R. W.; Meyer, R. E.; and Hein, H., Jr. "Soil Persistence of Tebuthiuron in the Clayplan Resource Area of Texas." *Weed Science*, 30 (1982): 140-144.

Bovey, R. W.; Richardson, C.; Burnett, E.; Merkle, M. B.; and Meyer, R. E. "Loss of Spray and Pelleted Picloram in Surface Runoff Water." *Journal of Environmental Quality*, 7 (1978): 178-180.

Bovey, R. W., and Scifres, C. J. *Residual Characteristics of Picloram in Grassland Ecosystems. Texas Agricultural Experiment Station Bulletin B-1111.* College Station, Texas: Texas A&M University, 1971.

Branson, F. A.; Gifford, G. F.; Renard, K. G.; and Hadley, R.F. *Rangeland Hydrology*. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1981.

Brock, J. H.; Scifres, C. J.; and Hahn, R. R. *Influence of Herbicides on Weed Control and the Establishment of Grasses in Rangeland Reseeding. Texas Agricultural Station Program Report 2811.* Rolling Plains, Texas: Texas A&M University, 1970.

Bryant, F. C.; Taylor, C. A.; and Merrill, L. B. "White-tailed Deer Diets from Pastures in Excellent and Poor Range Condition." *Journal of Range Management*, 34(3) (1981): 193-200.

Cable, D. R., and Martin, S. C. *Forage Production and Stocking Rates on Southern Arizona Ranges Can Be Improved: U.S. Forest Service Research Note RM-30*. Fort Collins, Colorado: Colorado State University, 1964.

Canfield, R. H. *Semi-Deferred Grazing as a Restorative Measure for Black Grama Ranges: Southwestern Forest and Range Experiment Station Research Note No. 80*. Washington, D.C.: Government Printing Office, 1939.

Conover, C. S. *Ground Water Conditions in the Rincon and Mesilla Valleys and Adjacent Areas in New Mexico. U.S.G.S. Water Supply Paper 1230*. Washington, D.C.: Government Printing Office, 1954.

Conover, C. S.; et al. "Occurrence of Ground Water in Southcentral New Mexico: New Mexico Geological Society Guidebook." Presented at 6th Field Conference, Southcentral New Mexico. Albuquerque, New Mexico: New Mexico Geological Society, 1955.

Currier, W. F.; Norris, L. A.; Gratkowski, H.; and Graham, C. "Report On Background Information for the Phenoxy Herbicides." Santa Fe, New Mexico: BLM New Mexico State Office, 1972.

Davis, C. A.; Brakley, R. C.; and Haussamen, W. C. "Scaled Quail Foods in Southeastern New Mexico." Journal of Wildlife Management, 30(3) (1975): 496-502.

Dick-Peddie, W. A.; Gross, F. A.; Hicks, T. L.; and Durante, L. "Unique Wildlife Ecosystem Concept Plan for the State of New Mexico." Prepared for U.S. Fish and Wildlife Service, Region Seven. Santa Fe, New Mexico: U.S. Fish and Wildlife Service, 1978.

Dickson, R. E.; Fisher, C. E.; and Marion, P. T. Summer Grazing Experiments on Native Grassland at Spur 1942-1947: Texas Agriculture Experiment Station Progress Report 1123. Albuquerque, New Mexico: U.S. Forest Service, 1948.

Dobrott, S., Gray Ranch Biologist. Possible Occurrence of Gray Wolf in Cowboy Springs WSA. (personal communication) Linda Seibert, EIS Team Wildlife Biologist, BLM Las Cruces District Office, November 1981.

Donaldson, B. R. "Abundance and Distribution of Javelina in Southwestern New Mexico." M.S. Thesis. Las Cruces, New Mexico: New Mexico State University, 1965.

Doty, G. C. Technical Report 15: Reconnaissance of Ground Water in Playas Valley, Hidalgo County, New Mexico. Santa Fe, New Mexico: New Mexico State Engineer, 1960.

Dow Chemical Co. "Technical Information on Dowco 290--A New Experimental Herbicide." Midland, Michigan: Ag-Organics Department, Dow Chemical Company, n.d.

Earth Environmental Consultants, Inc. "Water Quality and Quantity and Sediment Yield Study for the Southern Rio Grande Range EIS Area, New Mexico." (BLM contact) Las Cruces, New Mexico: BLM Las Cruces District Office, 1979.

Eastman, C.; Harper, W. M.; and Gomez, B. "Full-Time Vs. Part-Time Farming: Goals and Needs of New Mexico's Small Producers." Paper presented at the Fifth World Congress for Rural Sociology, Mexico D. F., Mexico. Las Cruces, New Mexico: New Mexico State University, August 7-12, 1980.

Eddy, T. A. "Foods and Feeding Patterns of the Collared Peccary in Southern Arizona." Journal of Wildlife Management, 25 (1961): 248-257.

Egbert, J. C. "Endangered and Threatened Vertebrate Species Survey and Report: Guadalupe Canyon Instant Study Area; Hidalgo County, New Mexico." (Contract No. 519-67-05) Las Cruces, New Mexico: BLM Las Cruces District Office, 1976.

Environmental Studies Board. Water Quality Criteria 1972: A Report of the Committee on Water Quality Criteria, EPA R3 73-033. Washington, D.C: Environmental Protection Agency, 1972.

Erb, E. E., Jr. "Petrologic and Structural Evolution of Ash Flow Tuff Cauldrons and Noncauldron-Related Volcanic Rocks in the Animas and Southern Peloncillo Mountains, Hidalgo County, New Mexico." Ph.D. Dissertation. Albuquerque, New Mexico: University of New Mexico, 1979.

Everitt, J. H.; Gonzalez, G. L.; Alaniz, M. A.; and Latigo, G. V. "Food Habits of the Collared Peccary on South Texas Rangelands." Journal of Range Management, 34(2) (1981): 141-144.

Findley, J. S.; Harris, A. H.; Wilson, D. E.; and Jones, C. Mammals of New Mexico. Albuquerque, New Mexico: University of New Mexico Press, 1975.

Fryer, J. D.; Smith, P. D.; and Ludwig, J. W. "Long-Term Persistence of Picloram in a Sandy Loam Soil." Journal of Environmental Quality, 8 (1979): 83-86.

Galt, H. D.; Theurer, B.; Ehrenreich, J. H.; Hale, W. E.; and Martin, S. C. "Botanical Composition of Diet of Steers Grazing A Desert Grassland Range." Journal of Range Management, 22 (1969): 14-19.

Germano, D. J. "Response of Selected Wildlife to Mesquite Removal in Desert Grassland." M.S. Thesis. Tucson, Arizona: University of Arizona, 1978.

Gonzalez-Rodriquez, J.; Pieper, R. D.; and Smith, G. S. Botanical Composition of Cattle Diets on Desert Grassland Range: Agricultural Experiment Station Research Report 363. Las Cruces, New Mexico: New Mexico State University, 1978.

Gould, W. L. Wind Erosion Curtailed by Controlling Mesquite. Journal Article No. 825. Las Cruces, New Mexico: Agricultural Experiment Station, New Mexico State University, 1982.

Gray, J. R.; Jones, M. L.; and Fowler, J. M. Organization, Costs, and Returns of Cattle Ranches in Southwestern New Mexico, 1979: Agricultural Experiment Station. Bulletin 684. Las Cruces, New Mexico: New Mexico State University, 1981.

Gray, J. R.; Steiger, C.; and Fowler, J. M. Characteristics of Grazing Systems: Agricultural Experiment Station Research Report 467. Las Cruces, New Mexico: New Mexico State University, 1982.

Greenwood, E. "Oil and Gas Possibilities in the Pedregosa Basin." Oil and Gas Journal, 67(40) (1969).

Greenwood, E.; Kottlowski, F. E.; and Thompson, S. III. "Petroleum Potential and Statigraphy of the Pedregosa Basin, Comparison with Permian and Orogrande Basins." American Association of Petroleum Geologists Bulletin, 61(9) (1976).

Halifax, J. C., and Scifres, C. S. "Influence of Dicamba on Development of Range Grass Seedlings." Weed Science, 20 (1972): 414-416.

Harbridge House, Inc. "Socio-Economic Analysis of Proposed Grazing Management Programs in the Southern Rio Grande Planning Area of New Mexico." (BLM contract) Boston, Massachusetts: Harbridge House, Inc., 1981.

____________. "Southwestern New Mexico Social-Economic Profile." (BLM contract) Denver, Colorado: Harbridge House, Inc., 1978.

Hardie, L. Wilderness Park Coalition. Potential Protective Stipulations/Designations for the Franklin Mountains. (personal communication) Donita C. Cotter, EIS Team Outdoor Recreation Planner, BLM Las Cruces District Office, July 27, 1982.

Health Research and Analysis, Inc. "A Report on the Rare, Threatened, or Endangered Plants Species in the Las Cruces/Lordsburg Resource Area." (BLM Contract No. YA-553-CT1-125) (in preparation) Las Cruces, New Mexico: BLM Las Cruces District Office, 1983.

____________. "Water Resource Inventory in the Southwest EIS Area, New Mexico." (BLM contract) BLM Las Cruces, New Mexico: Las Cruces District Office, 1982.

Herbel, C. H. New Mexico State University. Vegetation Response to Decreased Cattle Use and Little or No Brush Control. (telephone conversation) Bea Wade, EIS Team Range Conservationist, BLM Las Cruces District Office, October 5, 1982.

____________. New Mexico State University. Effects of Brush Control Experiments on the Jornada Range. (field trip) MFP Amendment/EIS Team, BLM Las Cruces District Office, August 11, 1982.

Herbel, C. H., and Gould, W. L. Managing Semidesert Ranges of the Southwest: Cooperative Extension Service Circular 456. Las Cruces, New Mexico: New Mexico State University, 1980.

Herbel, C. H., and Nelson, A. B. "Species Preference of Hereford and Santa Gertrudis Cattle on a Southern New Mexico Range." Journal of Range Management, 19 (1966): 177-181.

Hester, T. R. An Archaeological Survey of the Radium Springs Area, Southern New Mexico: Archaeological Survey Report No. 26. San Antonio, Texas: Center for Archaeological Research, University of Texas at San Antonio, 1977.

Holecheck, J. L. "Livestock Grazing Impacts on Public Lands: A View Point." Journal of Range Management, 34(3) (1981): 251-254.

Hubbard, J. P. "A Biological Inventory of the Lower Gila River Valley, New Mexico." (Jointly prepared by the Bureau of Land Management, Bureau of Reclamation, New Mexico Department of Game and Fish, Soil Conservation Service, U.S. Fish and Wildlife Service, and the U.S. Forest Service.) Las Cruces, New Mexico: BLM Las Cruces District Office, 1977.

__________. "The Summer Birds of the Gila Valley, New Mexico." *Nemouria 2*, 2 (1971): 5-12.

Hubbard, J. P.; Conway, M. C.; Campbell, H.; Schmitt, G.; and Hatch, M. D. *Handbook of Species Endangered in New Mexico*. Santa Fe, New Mexico: New Mexico Department of Game and Fish, 1979.

Jacoby, P. W.; Meadors, D. H.; and Foster, M. A. "Control of Honey Mesquite with 3,6-Dichloropicolinic Acid." *Weed Science*, 29 (1981): 376-378.

Jacoby, P. W.; Vechert, D. M.; Hartman, F. S. "Control of Creosotebush with Pelleted Tebuthiuron." *Weed Science*, 30 (1982): 307-310.

Jennings, B. Grant Geophysical Exploration. *Geophysical Exploration Costs*. (meeting) Gerald Sanchez, EIS Team Economist. BLM Las Cruces District Office, August 4, 1982.

Johnsen, T. "Picloram in Water and Soil From a Semiarid Pinyon-Juniper Watershed." *Journal of Environmental Quality*, 9 (1980): 601-605.

Johnson, R. R.; Carothers, S. W.; and Wertheimer, D. B. "The Importance of the Lower Gila River, New Mexico as a Refuge for Threatened Wildlife." M.S. Thesis. Las Cruces, New Mexico: BLM Las Cruces District Office, 1974.

Jones, K. B. *Distribution, Ecology, and Habitat Management of the Reptiles and Amphibians of the Hualapai-Aquarius Planning Area, Mohave and Yavapui Counties, Arizona. Technical Note No. 353.* Denver, Colorado: Denver Service Center, 1981.

King, W. E.; Hawley, J. W.; Taylor, A. M.; and Wilson, R. P. *Geology and Groundwater Resources of Central and Western Dona Ana County, New Mexico. Hydrologic Report 1*. Socorro, New Mexico: New Mexico State Bureau of Mines and Mineral Resources, 1971.

__________. *Hydrogeology of the Rio Grande Valley and Adjacent Intermontane Areas of Southern New Mexico*. Las Cruces, New Mexico: *Water Resources Research Institute, 1969.*

Kingsburg, J. M. *Poisonous Plants of the United States and Canada*. Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1964.

LaBounty, J. F. "The Status of the Native Fish Fauna of the Upper Gila River, New Mexico." Las Cruces, New Mexico: BLM Las Cruces District Office, n.d.

LaFrance, L. J. *Feasibility Study of Geothermal Energy for Heating Greenhouses.* Las Cruces, New Mexico: New Mexico Energy Institute (NMEI41), New Mexico State University, 1979.

Lansford, R. R. *Utilization of Geothermal Energy for Agribusiness Development in Southwestern New Mexico.* Albuquerque, New Mexico: New Mexico Energy Research and Development Program, 1981.

LeBlanc, S., and Whalen, M. *An Archaeological Synthesis of South-Central and Southwestern New Mexico.* Albuquerque, New Mexico: Office of Contract Archaeology, University of New Mexico, 1980.

Lifestyle. "Report From an Interagency Field Evaluation of Various Methods Controlling Mesquite in New Mexico" (unpublished) Las Cruces, New Mexico: BLM Las Cruces District Office, 1982.

Lohse, R. New Mexico Energy Institute, New Mexico State University. *Geothermal Exploration Costs.* (telephone conversation) Joe Torrez, EIS Team Geologist, BLM Las Cruces District Office, October 27, 1982.

Lutz, J. F.; Byers, G. E.; and Sheets, T. J. "The Persistence and Movement of Picloram + 2,4,5-T in Soils." *Journal of Environmental Quality*, 2 (1973): 485-488.

Lynott, W. P. *Climate and Dispersion Meteorology of BLM Lands in New Mexico.* LaJolla, California: Science Applications, Inc., 1978.

Martin, S. C. "The Santa Rita Grazing System." *Proceedings of the First International Rangeland Congress*, 1 (1978): 573-575.

__________. *Ecology and Management of Southwestern Semidesert Grass-Shrub Ranges: The Status of Our Knowledge: Forest Service Research Paper RM-156.* Fort Collins, Colorado: Rocky Mountain Forest and Range Experiment Station, 1975.

__________. *The Santa Rita Experimental Range: A Center for Research on Improvement of Semidesert Rangelands: USDA, Forest Service Rocky Mountain Forest and Range Experiment Station Research Paper RM-2.* Washington, D.C.: Government Printing Office, 1966.

Merkle, M. G.; Bovey, R. W.; and Davis, F. S. "Factors Affecting the Persistence of Picloram in Soil." *Agronomy Journal*, 59 (1967): 413-415.

Millsap, B. A. "Distributional Status of Falconiformes in West Central Arizona with Notes on Ecology, Reproductive Success, and Management." Phoenix, Arizona: Bureau of Land Management, 1981.

Moir, W. H. "Soil-Vegetation Patterns in the Central Peloncillo Mountains, New Mexico." *The American Midland Naturalist*, 102(2) (1979): 317-331.

National Research Council. Principles of Plant and Animal Pest Control II Weed Control Publication No. 1597. Washington, D.C.: National Academy of Sciences, 1968.

National Toxicology Program. Technical Report: Carcinogenesis Bioassay of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (Case. No. 1746-01-6) in Osborne-Mendel Rats and B6C3F1 Mice (Gavage Study). Las Cruces, New Mexico: BLM Las Cruces District Office, 1982.

New Mexico Border Development Bureau. A Socio-Economic Profile of the Border Region. Santa Fe, New Mexico: State Planning Division, Department of Finance and Administration, 1979.

New Mexico Bureau of Mines and Mineral Resources. "New Mexico's Energy Resources, 1981. Santa Fe, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1982.

New Mexico Department of Game and Fish. "Summary and Analysis of Deer Hunter Survey." (unpublished) Santa Fe, New Mexico: New Mexico Department of Game and Fish, 1982.

__________. Revisions of maps of big game herds: Present and Optimum Populations. (personal communication) EIS Team Wildlife Biologist, Linda Seibert, BLM Las Cruces District Office, 1982.

__________. Proclamation Big Game, Turkey, and Furbearer Seasons (April 1, 1981 through March 31, 1982). Santa Fe, New Mexico: New Mexico Department of Game and Fish, 1981-1982.

__________. "1981 Deer Bow/Muzzle Loader Survey." (unpublished) Santa Fe, New Mexico: New Mexico Department of Game and Fish, 1981.

__________. Comprehensive Plan: Strategic Section. Las Cruces, New Mexico: New Mexico Department of Game and Fish, 1978.

New Mexico Heritage Program. "Computer Printout of Rare and Endangered Plant Species." (unpublished) Santa Fe, New Mexico: New Mexico Heritage Program, 1982.

New Mexico Interstate Stream Commission and The New Mexico State Engineer Office. Water Resources Assessment For Planning Purposes; Dona Ana, Luna, Hidalgo, and Grant Counties. Santa Fe, New Mexico: New Mexico Interstate Stream Commission, 1975.

New Mexico Oil and Gas Association. Oil and Gas Facts 1982. Santa Fe, New Mexico: New Mexico Oil and Gas Association, 1982.

New Mexico Range Brush and Weed Technical Committee. Report No. 1: Mesquite Control in New Mexico. Las Cruces, New Mexico: New Mexico State University, 1982.

New Mexico State Engineer. *Rules and Regulations Governing Drilling of Wells and Appropriation and Use of Groundwater in New Mexico.* Santa Fe, New Mexico: New Mexico State Engineer, 1966, revised 1980.

____________. *Water Resources of New Mexico Occurrence, Development and Use*. Santa Fe, New Mexico: State Planning Office, 1967.

New Mexico Water Resources Research Institute. *An Analytical Interdisciplinary Evaluation of the Utilization of the Water Resources of the Rio Grande in New Mexico: Lower Rio Grande Region*. *W.R.R.I. Report No. 024*. Las Cruces, New Mexico: New Mexico State University, 1974.

Nielsen, D. B., Workman, J. P. *The Importance of Renewable Grazing Resources on Federal Lands in the 11 Western States*. Logan, Utah: Utah Agricultural Experiment Station, Utah State University, 1971.

Norris, J. J., and Valentine, K. A. *Principal Livestock Poisoning Plants of New Mexico Ranges: Agricultural Experiment Station Bulletin 390*. Las Cruces, New Mexico: New Mexico State University, 1954.

Norris, L. A., and Montgomery, M. L. "Dicamba Residues in Streams After Forest Spraying." *Bulletin of Environmental Contamination and Toxicology*, 13(1) (1975): 1-8.

Norris, L. A.; Montgomery, M. L.; and Johnson, E. R. "The Persistence of 2,4,5-T in a Pacific Northwest Forest." *Weed Science*, 25 (1977): 417-422.

Norton, B. E. "Impacts of Grazing Intensity and Specialized Grazing Systems on Vegetation Composition and Production." Workshop on Impacts of Grazing Intensity and Specialized Grazing Systems on the Use and Value of Rangeland. El Paso, Texas: National Research Council Commission on Natural Resources, March 16-17, 1981.

O'Connor, G. A., and Anderson, J. V. "Soil Factors Affecting the Adsorption of 2,4,5-T." *American Society of Soil Scientists Proceedings*, 38 (1974): 433-436.

O'Connor, G. A., and Wierenga, P. J. *The Persistence of 2,4,5-T in Greenhouse Lysimeter Studies*. Las Cruces, New Mexico: New Mexico State University, 1973.

O'Connor, G. A.; Wierenga, P. J.; Cheng, H. H.; and Doxtader, K. G. "Movement of 2,4,5-T Through Large Soil Columns." *Soil Science*, 130(3) (1980): 157-162.

Office of the Federal Register, National Archives and Records Service, General Services Administration. *Code of Federal Regulations 43 CFR Subpart 3103.3-2*. Washington, D.C.: Government Printing Office, 1981.

__________. *Code of Federal Regulations 43 CFR Subpart 1601.* Washington, D.C.: Government Printing Office, 1979.

Pacific Southwest Interagency Committee (PSIAC). *Factors Affecting Sediment Yield and Measures for the Reduction of Erosion and Sediment Yield: Report of the Water Management Subcommittee*. Las Cruces, New Mexico: BLM Las Cruces District Office, 1968.

Paulsen, H. A., Jr., and Ares, F. N. *Grazing Values and Management of Black Grama and Tobosa Grasslands and Associated Shrub Ranges of the Southwest: Forest Service Technical Bulletin No. 1270*. Washington, D.C.: Government Printing Office, 1962.

Peiper, R. D., and Beck, R. F. "Importance of Forbs on Southwestern Ranges." *Rangelands*, 2(1) (1980): 35-36.

Pieper, R. D., and Donart, G. B. "Drought on the Range: Drought and Southwestern Vegetation." *Rangeman's Journal*, 2(6) (1975): 176-178.

Plumb, T. R.; Norris, L. A.; and Montgomery, M. L. "Persistence of 2,4-D and 2,4,5-T in Chaparral Soil and Vegetation." *Bulletin of Environmental Contamination and Toxicology*, 17 (1977): 1-8.

Ratliff, E. Federal Land Bank. *1980 Market Value of Animal Unit Months* (telephone conversation) Gerald Sanchez, EIS Team Economist, BLM Las Cruces District Office, August 2, 1982.

Regional Analytics. "Las Cruces Lordsburg Input-Output Model" (BLM Contract) Santa Barbara, California: BLM Las Cruces District Office, 1982.

Reiter, D. R. "Geology of the Alamo Hueco and Dog Mountains, Hidalgo County." M.S. Thesis. Albuquerque, New Mexico: University of New Mexico, 1980.

Reitzel, J. A. "The Effects of Brush Control on Bird Populations in a Mesquite Community." M.S. Thesis. Las Cruces, New Mexico: New Mexico State University, 1982.

Rosiere, R. E.; Beck, R. F.; and Wallace, J. D. "Cattle Diets on Semidesert Grassland: Botanical Composition." *Journal of Range Management*, 28(2) (1975): 89-93.

Sandoval, A. New Mexico Department of Game and Fish. *Future Bighorn Sheep Reintroduction Sites in Relation to Wilderness Study Areas.* (telephone conversation) Linda Seibert, EIS Team Wildlife Biologist, BLM Las Cruces District Office, March 1982.

__________. "Evaluation of the Peloncillo and Alamo Hueco Mountains, New Mexico as Potential Desert Bighorn Habitat; Final Report." (Contract No. 1/A-512-CT7-91) Las Cruces, New Mexico: BLM Las Cruces District Office, 1982.

__________. Status of Bighorn Sheep in the Big Hatchet Mountains. (Memorandum to Jim Johnson and Walt Snyder) Santa Fe, New Mexico: New Mexico Department of Game and Fish, September 17, 1981.

__________. Preliminary Survey Report; Evaluation of Historic Desert Bighorn Sheep Ranges. Santa Fe, New Mexico: New Mexico Department of Game and Fish, 1978.

Schickedanz, J. Poisonous Range Plants of New Mexico. Las Cruces, New Mexico: Cooperative Extension Service, New Mexico State University, 1981.

Schmidt, J. L., and Gilbert, D. L. Big Game of North America; Ecology and Management. Harrisburg, Pennsylvania: Stackpole Books, 1978.

Scifres, C. J. Brush Management--Principles and Practices for Texas and the Southwest. College Station, Texas: Texas A&M University Press, 1980.

__________. "Herbicides and the Range Ecosystem." (unpublished) College Station, Texas: Range Science Department, Texas A&M University, 1975.

Scifres, C. J., and Halifax, J. C. "Development of Range Grasses Germinated in Picloram." Weed Science, 20 (1972): 341-344.

Scifres, C. J.; McCall, H. G.; Maxey, R.; and Tai, H. "Residual Characteristics of 2,4,5-T and Picloram in Sandy Rangeland Soils." Journal of Environmental Quality, 6(1) 1977: 36-42.

Seager, W. R. "Cenezoic Tectonic Evolution of the Las Cruces Area, New Mexico." Las Cruces Country, New Mexico Geological Society Guidebook, Twenty-sixth Field Conference. Socorro, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1975.

__________. "Geology of Organ Mountains and Southern San Andres Mountains, New Mexico." Memoir 36. Socorro, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1981.

Sorensen, E. F. Water Use by Categories in New Mexico Counties and River Basins, and Irrigated Dry Cropland Acreage in 1975: Technical Report 41. Santa Fe, New Mexico: New Mexico State Engineer, 1977.

Sosebee, R. E., and Dahl, B. E. Effects of Mesquite Spraying on Other Rangeland Resources, Technical Note No. 341. Denver, Colorado: Denver Service Center, 1979.

Spellenberg, R. A Report on the Survey for Threatened and Endangered Plant Species in Guadalupe Canyon and Vicinity, Hidalgo Co., N.M. (Contract No. 67-541-109) Las Cruces, New Mexico: BLM Las Cruces District Office, 1979.

________. "Review of Federally Threatened or Endangered Plant Species in the Las Cruces District of the Bureau of Land Management, U.S. Department of the Interior." (BLM Contract No. NM-910-PH8-365) Las Cruces, New Mexico: BLM Las Cruces District Office, 1970.

Springer, M. D. "Vegetation Production and Allotment on Southwestern New Mexico Rangelands." Las Cruces, New Mexico: BLM Las Cruces District Office, 1979.

Stoddart, L. A.; Smith, A. D.; and Box, T. W. Range Management. New York, New York: McGraw-Hill Book Company, 1975.

Technology Research and Development, Inc. "Water Resources and Soil Loss/Sediment Yield Investigations of the Sacramento Range Study Area, South-Central New Mexico. Vol. I-III." (BLM Contract) Las Cruces, New Mexico: BLM Las Cruces District Office, 1980.

Temple, L. New Mexico Department of Game and Fish. Deer Hunter Days and Deer Hunter Pressure in the Gila Deer Herd Unit. (personal communication) Donita C. Cotter, EIS Team Outdoor Recreation Planner, BLM Las Cruces District Office, October 1, 1982.

Thompson, S., and Bierberman, R. A. "Oil and Gas Exploration Wells in Dona Ana County, New Mexico." Las Cruces Country, New Mexico Geological Society Guidebook, Twenty-sixth Field Conference. Socorro, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1975.

Trauger, F. D. Water Resources and General Geology of Grant County, New Mexico: Hydrologic Report 2. Socorro, New Mexico: New Mexico State Bureau of Mines and Mineral Resources, 1972.

Trauger, F. D., and Herrick, E. H. Technical Report 26: Groundwater in Central Hachita Valley Northeast of the Big Hatchet Mountains, Hidalgo County, New Mexico. Santa Fe, New Mexico: New Mexico State Engineer, 1962.

Upchurch, R. I. "Behavior of Herbicides in Soil." Residue Review, 16 (1966): 46-85.

United States Code; 30 USC Sec. 191, Amended December 17, 1981 (95 Stat. 1205). Washington, D.C.: Government Printing Office, 1981.

U.S. Department of Agriculture, Economics Statistics and Cooperative Service. Regional Development and Plan Evaluation, The Use of Input-Output Analysis: Agriculture Handbook No. 530. Washington, D.C.: Government Printing Office, 1978.

U.S. Department of Agriculture, Environmental Protection Agency. "A Report of the USDA-States-EPA, 2,4,5-T RPAR Assessment Team. The Biologic and Economic Assessment of 2,4,5-T." Santa Fe, New Mexico: Bureau of Land Management, 1979.

U.S. Department of Agriculture, Forest Service. Draft Environmental Impact Statement: Proposed Coronado National Forest Plan. Tucson, Arizona: Coronado National Forest, 1982.

__________. Final Environmental Statement: Vegetation Management With Herbicides (Volume 1). Portland, Oregon: Pacific Northwest Region, 1978.

__________. A Proposal for Vegetative Control With Herbicides in the State of New Mexico, Draft Environmental Statement. Albuquerque, New Mexico: Southwestern Region, 1973.

U.S. Department of Agriculture, Science and Education Administration--Agricultural Research. Annual Research Progress Report (CY 1979): Jornada Experimental Range. Las Cruces, New Mexico: New Mexico State University, 1980.

U.S. Department of Agriculture, Soil Conservation Service. Technical Guides: Range Site Description: Transmittal Notice No. 472. Albuquerque, New Mexico: Soil Conservation Service, 1982.

__________. Soil Survey of Luna County, New Mexico. Washington, D.C.: Government Printing Office, 1980.

__________. Technical Guide: Range Site Descriptions for SD-2: Transmittal Notice No. 403. Albuquerque, New Mexico: Soil Conservation Service, 1980.

__________. Technical Guide: Range Site Descriptions for WP-3: Transmittal Notice No. 352. Albuquerque, New Mexico: Soil Conservation Service, 1980.

__________. "Classification and Correlation of the Soils of the Grant County, New Mexico, Central and Southern Parts." (unpublished) Portland, Oregon: West Technical Service Center, 1979.

__________. National Range Handbook. Washington, D.C.: Government Printing Office, 1976.

U.S. Department of Agriculture, Soil Conservation Service and Forest Service. Soil Survey of Hidalgo County, New Mexico. Washington, D.C.: Government Printing Office, 1973.

U.S. Department of Commerce, Bureau of the Census. 1980 Census of Population, New Mexico. Washington, D.C.: Government Printing Office, 1982.

__________. Census of Population, 1950-1980. Washington, D.C.: Government Printing Office, 1982.

U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. 62(4) (1982): 63.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Climate of New Mexico. Washington, D.C.: Government Printing Office, 1972.

____________. Climatological Data. Asheville, North Carolina: National Climatic Center, 1970-1980.

____________. Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1941-1970: No. 81-New Mexico. Asheville, North Carolina: National Climatic Center, 1973.

U.S. Department of the Interior, Bureau of Land Management. Las Cruces/ Lordsburg Input-Output Model. Las Cruces, New Mexico: Las Cruces District Office, 1982.

____________. Interactive Economic I-O Program for the Honeywell System. Denver, Colorado: Denver Service Center, 1982.

____________. Las Cruces District Economic Files: "Technical Report, Detailed Methodologies for Developing Range Budgets." (unpublished) Las Cruces, New Mexico: Las Cruces District Office, 1982.

____________. Las Cruces District Office Range Inventory Files (1616). Las Cruces, New Mexico: Las Cruces District Office, 1981-1982.

____________. Las Cruces/Lordsburg Linear Analysis Model. Las Cruces, New Mexico: Las Cruces District Office, 1982.

____________. Southern Rio Grande Management Framework Plan. Las Cruces, New Mexico: Las Cruces District Office, 1982.

____________. Update of the Social-Economic Profile. (Information on file in the Las Cruces District Office.) Las Cruces, New Mexico: Las Cruces District Office, 1982.

____________. West Socorro EIS/Rangeland Management Program. Socorro, New Mexico: Socorro District Office, April 1982.

____________. Draft Grazing Environmental Impact Statement: Southern Rio Grande Planning Area. Las Cruces, New Mexico: Las Cruces District Office, 1981.

____________. "Integrated Habitat Inventory Classification System Data." (unpublished) Las Cruces, New Mexico: Las Cruces District Office, 1979, 1981.

____________. Mineral Resources Inventory. (12 Reports) Las Cruces, New Mexico: Las Cruces District Office, 1981.

____________. "Range Management Program for the Divide Planning Area, New Mexico, for the Period October 1, 1982 - September 30, 1992." Socorro, New Mexico: Socorro District Office, 1981.

__________. *Wilderness Management Policy*. Washington, D.C.: Government Printing Office, 1981.

__________. *Draft Environmental Assessment; Oil and Gas Leasing, Big Hatchets, Alamo Huecos*. Las Cruces, New Mexico: Las Cruces District Office, 1980.

__________. *New Mexico Wilderness Study Area Decisions*. Santa Fe, New Mexico: New Mexico State Office, 1980.

__________. *Wilderness Review: Intensive Inventory of Public Lands Administered by the Bureau of Land Management, Decision Report*. Phoenix, Arizona: Arizona State Office, 1980.

__________. *East Roswell Draft Grazing Environmental Statement*. Roswell, New Mexico: Roswell District Office, 1979.

__________. *Florida Mountains Habitat Management Plan*. (BLM Contract No. NM-3-WHA-T17) Las Cruces, New Mexico: Las Cruces District Office, 1979.

__________. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. Washington, D.C.: Government Printing Office, 1979.

__________. *Livestock Grazing Management and Water Quality Protection: EPA 910/9-79-67*. Denver, Colorado: Denver Service Center, 1979.

__________. *San Juan Grazing Management Environmental Impact Statement*. Dallas, Texas: Government Printing Office, 1979.

__________. *Gila Management Framework Plan*. Las Cruces, New Mexico: Las Cruces District Office, 1978.

__________. *Aden Lava Flow Natural Area Management Plan*. Las Cruces, New Mexico: Las Cruces District Office, 1977.

__________. *Environmental Assessment Record No. NM-030-76-436, Aden Lava Flow Proposed Research Natural Area*. Las Cruces, New Mexico: Las Cruces District Office, 1976.

__________. *Federal Land Policy and Management Act* (Public Law 94-579). Washington, D.C.: Government Printing Office, 1976.

__________. *Las Uvas Management Framework Plan*. Las Cruces, New Mexico: Las Cruces District Office, 1975.

__________. *Comparison Area Data Studies*. Las Cruces, New Mexico: Las Cruces District Office, 1973.

__________. *Hermanas Management Framework Plan*. Las Cruces, New Mexico: Las Cruces District Office, 1969, revised 1971.

__________. "Draft Environmental Assessment for Wilderness Study Areas in the Las Cruces District." (in preparation) Las Cruces, New Mexico: Las Cruces District Office.

U.S. Department of the Interior, Bureau of Reclamation. *Upper Gila River Water Supply Stage I Preliminary Draft of a Biological Assessment*. Boulder City, Nevada: Lower Colorado Regional Office, 1981.

__________. *New Mexico Water Resources Assessment for Planning Purposes*. (In cooperation with the State of New Mexico.) Santa Fe, New Mexico: Bureau of Reclamation, 1976.

U.S. Department of the Interior, Fish and Wildlife Service. *Geothermal Handbook*. Washington, D.C.: Government Printing Office, 1976.

U.S. Department of the Interior, Geological Survey, Water Resources Division. *Water Resources Data for New Mexico*. Albuquerque, New Mexico: Geological Survey, Water Resources Division, 1980.

__________. *Hydrologic Maps and Data in the Mimbres Basin, New Mexico: Open-File Report 77-314*. Albuquerque, New Mexico: Geological Survey, 1977.

U.S. Department of the Interior, National Park Service. *Nationwide Rivers Inventory*. San Francisco, California: Western Region National Park Service, 1982.

U.S. Department of the Interior. *Wild and Scenic Rivers Act* (Public Law 90-542). Washington, D.C.: Government Printing Office, 1968.

University of New Mexico, Bureau of Business and Economic Research. *Data Bank 1982 Unemployment Rate for Grant County*. (telephone conversation) Gerald Sanchez, EIS Team Economist, BLM Las Cruces District Office, August 10, 1982.

__________. *Data Bank 1980 Employment in Las Cruces/Lordsburg Area*. (telephone conversation) Gerald Sanchez, EIS Team Economist, BLM Las Cruces District Office, August 10, 1982.

__________. *Data Bank 1980 Unemployment Rates in Las Cruces/Lordsburg Area*. (telephone conversation) Gerald Sanchez, EIS Team Economist, BLM Las Cruces District Office, August 10, 1982.

__________. *Per Capita Personal Income Selected Western States, 1980*. (telephone conversation) Gerald Sanchez, EIS Team Economist, BLM Las Cruces District Office, August 10, 1982.

Van Poollen, H. W., and Lacey, J. R. "Herbage Response to Grazing Systems and Stocking Intensities." *Journal of Range Management*, 32 (1979): 250-253.

Vest, D. R. "Computer Model for Population Projections--San Juan, McKinley, and Sandoval Counties." (unpublished) Pueblo, Colorado: Pueblo Regional Planning Commission, April 4, 1982.

Walker, T. "Doctor Says Agent Orange May Cause Illness, Cancer." *Roundup*. Las Cruces, New Mexico: New Mexico State University, October 2, 1978.

Wallmo, O. C. "Mule and Black-Tailed Deer." *Big Game of North America*. Harrisburg, Pennsylvania: Stackpole Books, 1978.

Watts, T. "Detrimental Movement Patterns in a Remnant Population of Bighorn Sheep (*Ovis canadensis mexicana*)." M.S. Thesis. Las Cruces, New Mexico: New Mexico State University, 1979.

Weed Science Society of America. *Herbicide Handbook*. Champaign, Illinois: Weed Science Society of America, 1979.

Wengard, S. A. "Petroleum Prospects in Southwesternmost New Mexico." *New Mexico Geological Society Guidebook, Tyrone-Big Hatchet Mountains-Florida Mountains Region*. Socorro, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1970.

Wilson, C. A.; White, R. R.; Orr, B. R.; and Roybal, R. G. *Technical Report 43: Water Resources of the Rinson and Mesilla Valleys and Adjacent Areas, New Mexico*. Santa Fe, New Mexico: New Mexico State Engineer, 1981.

Wilson, J. P. *Historical Profile of Southwestern New Mexico: Report No. 21*. Las Cruces, New Mexico: Cultural Resources Management Division, New Mexico State University, 1975.

Wisdom, G. New Mexico Department of Game and Fish. *Fish Surveys in the Redrock Area and Lower Box of the Gila River*. (personal communication) Linda Seibert, EIS Team Wildlife Biologist, BLM Las Cruces District Office, July 16, 1982.

Wood, J. E. *Rodent Populations and Their Impact on Desert Rangelands: Ag. Exper. Sta. Bull. 555*. Las Cruces, New Mexico: New Mexico State University, 1969.

Woodroof, W. O. "Ecology and Behavior of the Persian Wild Goat (*Capra aegagrus*) in New Mexico." M.S. Thesis. Las Cruces, New Mexico: New Mexico State University, 1979.

Yoakum, J. *Habitat Management Guides for the American Pronghorn Antelope: Tech. Note No. 347*. Denver, Colorado: Denver Service Center, 1980.

York, J. D., and Dick-Peddie, W. A. "Vegetation Changes in Southern New Mexico During the Past Hundred Years." *Arid Lands in Perspective*. Tucson, Arizona: The University of Arizona Press, 1969.

Zeller, H. M. *Analysis of Possible Reservoir Sites: Upper Gila River Storage Project*. (letter) USDI, National Park Service, BLM Las Cruces District Office, May 22, 1981.

__________. Issues Currently Affecting the Gila/San Francisco Watershed. (memorandum) Daniel C. B. Rathbun, District Manager, BLM Las Cruces District Office, January 3, 1981.

Zeller, R. A. "Petroleum Geology of Southwestern New Mexico." Abstract. New Mexico Geological Society Guidebook, Tyrone-Big Hatchet Mountains-Florida Mountains Region. Socorro, New Mexico: New Mexico Bureau of Mines and Mineral Resources, 1970.

INDEX

INDEX

ACEC
  Existing . . . 2-47--2-48
  Proposed . . . 1-28--1-30
Air Quality
  Affected Environment . . . 2-38
  Environmental Consequences of PA/Alternatives . . . 3-58
Alternatives to Proposed Action, Description of
  Elimination of Livestock Grazing . . . 1-35--1-37
  Enhancement of Other Resource Values . . . 1-32--1-35
  Maximization of Energy Minerals Leasing
    and Livestock Forage Production . . . 1-31--1-32
  No Action . . . 1-30--1-31
Assumptions and Guidelines . . . 3-2--3-4
Authorizing Actions . . . 1-37--1-38

Background . . . 1-1

Conformance . . . 1-5
Climate
  Affected Environment . . . 2-1--2-3
  Average Monthly and Annual Precipitation . . . 2-2
Consultation and Coordination . . . 4-1--4-8
Cultural Resources
  Affected Environment . . . 2-38
  Environmental Consequences of PA/Alternatives . . . 3-59--3-64
  Letters of Consultation . . . H-1--H-4
  Standard Operating Procedures . . . 1-27

Digitizing . . . B-9

Ecological Condition Class . . . 2-3--2-5, 3-5--3-7, 3-11--3-20,
    B-11, B-14--B-15, B-19--B-24, F-19--F-23
Economic Conditions
  Affected Environment . . . 2-57--2-63
  Assumptions . . . 3-3--3-4
  Environmental Consequences . . . 3-88--3-99
Energy Expenditure . . . 3-1
Energy Minerals Operations Under the Proposed Action . . . 1-7--1-14

Forage Value Class . . . 2-3--2-5, 3-5--3-7, 3-11--3-20,
    B-9--B-10, B-14--B-15

Geology and Mineral Resources . . . 2-23--2-27
Glossary . . . GL-1

Herbicides
  Assumptions . . . 1-28
  Proposed Action, Description . . . 1-23
  Vegetation Treatment Guidelines . . . B-1--B-6

Impacts, Summary of . . . 1-43--1-48
Interrelationships
  Federal Programs . . . 1-38--1-40
  State and Private Lands . . . 1-40--1-41
  State Programs . . . 1-41--1-42

Land Uses, Other
  Affected Environment . . . 2-50--2-51
Livestock Grazing
  Affected Environment . . . 2-27--2-29
  Allotment Management Categories . . . 1-17, 1-20, 1-24,
    1-33--1-34, 3-44--3-48, F-6--F-9, F-19--F-23
  Allotment Management Plans . . . 2-7, 2-30, 3-47, 3-51,
    F-1--F-8, F-10--F-23
  Environmental Consequences of PA/Alternatives . . . 3-44--3-49
  Production Practices and Problems . . . 2-27--2-29
  Rangeland Developments (MAX) . . . 3-13--3-14, F-13--F-18
  Rangeland Developments
    (PA/EORV) . . . 3-5, 3-6, 3-11, 3-18, F-10--F-12

Major Land Resource Areas
  Southern Desert, Subresource Area SD-2 . . . 2-3, 2-5, 2-7,
    2-10--2-11
  Western Plateau, Subresource Area WP-3 . . . 2-3, 2-5, 2-7, 2-11
Management Framework Plan Process . . . 1-3--1-5
Minerals Management Service . . . 1-39

Physical Setting . . . 2-1--2-2
Plant Species
  Desirable and Intermediate (Cattle) . . . 2-5, 3-6, B-9--B-10
  Major . . . 2-3, B-16--B-18
  Poisonous . . . 2-12, B-26--B-27
  Threatened or Endangered and Sensitive . . . 2-12, 2-14, 3-10,
    3-13, 3-14, 3-16, 3-20, B-28--B-34

Preparers, List of . . . 4-2--4-4
Proposed Action
  Description of . . . 1-6--1-30
  Objectives of . . . 1-6
  Purpose and Need . . . 1-1--1-3
  Standard Operating Procedures . . . 1-14--1-15, 1-26--1-29
Proposed Special Designation Areas . . . 1-28--1-30

Rangeland Consultation Policy . . . A-1--A-3
Recreation
  Affected Environment . . . 2-45--2-47
  Environmental Consequences of PA/Alternatives . . . 3-68--3-74
  Methodology-Hunter Visitor Hours . . . J-1
Review, Draft MFP Amendment/EIS . . . 4-4--4-10

Scoping Activities . . . 4-5--4-7
Site Write-Up Area (SWA) . . . 2-5, B-7--B-8
Social Conditions
  Affected Environment . . . 2-51--2-57
  Assumptions . . . 3-3
  Environmental Consequences of PA/Alternatives . . . 3-78--3-81
Soils
  Affected Environment . . . 2-12--2-14
  Environmental Consequences of PA/Alternatives . . . 3-20--3-24
  Range Sites by Erosion Condition Class . . . 2-14
  Classification of . . . 2-13
Soil-Vegetation Inventory . . . 2-3, B-7--B-8
Stipulations . . . E-1--E-15

Topography . . . 2-3

Vegetation
  Affected Environment . . . 2-3--2-12
  Apparent Trend . . . 2-5, 2-7, B-12--B-13, B-19--B-24
  Environmental Consequences of PA/Alternatives . . . 3-4--3-20
  Ground Cover . . . 2-3, 2-11, 3-6, 3-8, 3-11, 3-13,
    3-16, 3-18, 3-20, B-7--B-8, B-19--B-24
  Herbicide Effects . . . 3-9--3-10
  Production . . . 2-3, 2-5, 2-6, 3-9, B-7--B-8, B-19--B-24
  Range Sites . . . 2-3--2-7, 2-9--2-11, 3-6--3-8, 3-12,
    3-15, 3-17, 3-19, B-19--B-25
  Treatments, Chemical . . . 1-24, 1-33--1-34, 3-8--3-10,
    3-12, 3-45--3-48
  Treatments, Mechanical . . . 1-33--1-34, 3-8, 3-13--3-14,
    3-16, 3-47--3-48
  Vegetative Subtypes . . . 2-3, 2-7--2-11, B-19--B-24, B-25
Visual Resources
  Affected Environment . . . 2-43--2-45
  Contrast Rating System . . . I-2
  Distance Zones . . . I-1
  Environmental Consequences . . . 3-65--3-67
  Management Classes . . . Map 2-8
  Scenic Quality . . . I-1
  Standard Operating Procedures . . . 1-27
  Visual Sensitivity . . . I-1

Water Resources
  Affected Environment . . . 2-29--2-37
  Environmental Consequences of PA/Alternatives . . . 3-49--3-57
  Groundwater . . . 2-32--2-35, 3-50, 3-54
  Surface Water . . . 2-29--2-32, 3-49--3-50, 3-52--3-54
  Water Quality in Associaton With
    Chemical Treatments . . . 3-52--3-55
  Water Use . . . 2-36, 2-38, 3-55--3-57
Wilderness
  Affected Environment . . . 2-48--2-50
  Environmental Consequences of PA/Alternatives . . . 3-75--3-76
  Standard Operating Procedures . . . 1-27
  Wilderness Protection Stipulation . . . E-5--E-6
Wildlife
  Affected Environment . . . 2-14--2-23
  Big Game, Existing . . . 2-20--2-23
  Consultation, Section 7 . . . D-6
  Environmental Consequences of PA/Alternatives . . . 3-75--3-76
  Species List . . . D-19
  Standard Habitat Sites, Existing Situation . . . 2-15, 2-19
  Threatened or Endangered Species . . . 2-23
  Special Habitat Features . . . 2-19--2-20
  Areas of Critical Environmental
    Concern . . . 1-28--1-30, 3-42--3-43
  Nesting Data . . . 2-17
Wind Erodibility Groups . . . 2-14, C-6

☆U.S. GOVERNMENT PRINTING OFFICE:1983—676-071 / 44

Bureau of Land Management
Library
Bldg 50 Denver Federal Center
Denver, CO 80225

Form 1279—3
(June 1984)

BORROWER

SF 85.35 .N6 L67

Managemen t framew
amendment, envir

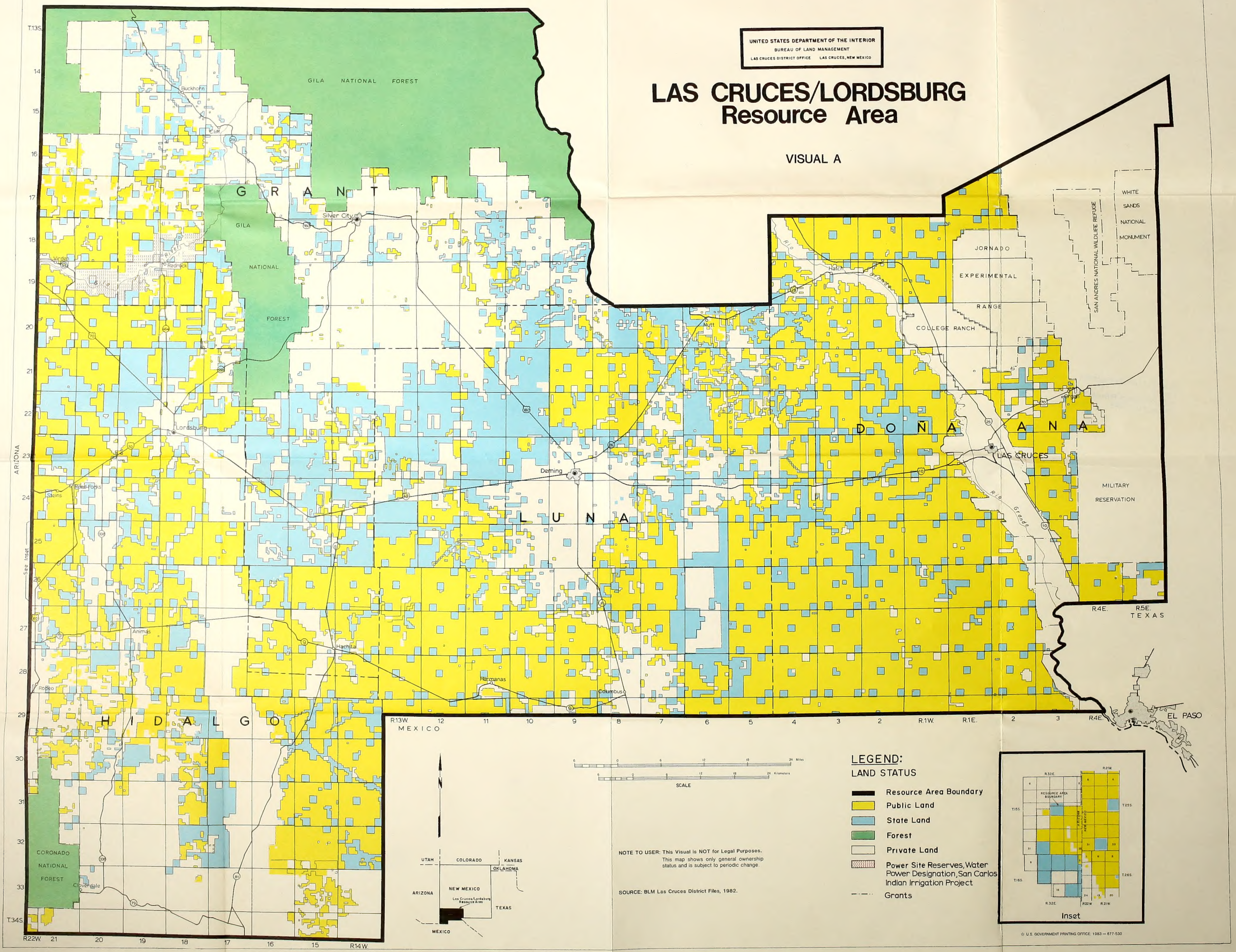
DATE LOANED	BORROWER

USDI — BLM

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE   LAS CRUCES, NEW MEXICO

LAS CRUCES/LORDSBURG Resource Area

VISUAL A


GILA NATIONAL FOREST
GRANT
GILA NATIONAL FOREST
Buckhorn
Cliff
Silver City
Virden
Redrock
Lordsburg
Road Forks
Steins
ARIZONA
See Inset
Animas
Rodeo
Cloverdale
CORONADO NATIONAL FOREST
HIDALGO
Hachita
Hermanas
Columbus
Deming
LUNA
Nutt
Hatch
Rio Grande
JORNADO EXPERIMENTAL RANGE
COLLEGE RANCH
SAN ANDRES NATIONAL WILDLIFE REFUGE
WHITE SANDS NATIONAL MONUMENT
DOÑA ANA
Organ
LAS CRUCES
MILITARY RESERVATION
TEXAS
EL PASO
MEXICO
T.13S.
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
T.34S.
R.22W.
21
20
19
18
17
16
15
R.14W.
R.13W.
12
11
10
9
8
7
6
5
4
3
2
R.1W.
R.1E.
2
3
R.4E.
R.4E.
R.5E.
SCALE
Miles
Kilometers
UTAH
COLORADO
KANSAS
OKLAHOMA
ARIZONA
NEW MEXICO
Las Cruces/Lordsburg Resource Area
TEXAS
MEXICO
Inset
R.32E.
R.21W.
RESOURCE AREA BOUNDARY
ARIZONA
NEW MEXICO
T.15S.
T.25S.
T.16S.
T.26S.
R.32E.
R.22W.
R.21W.

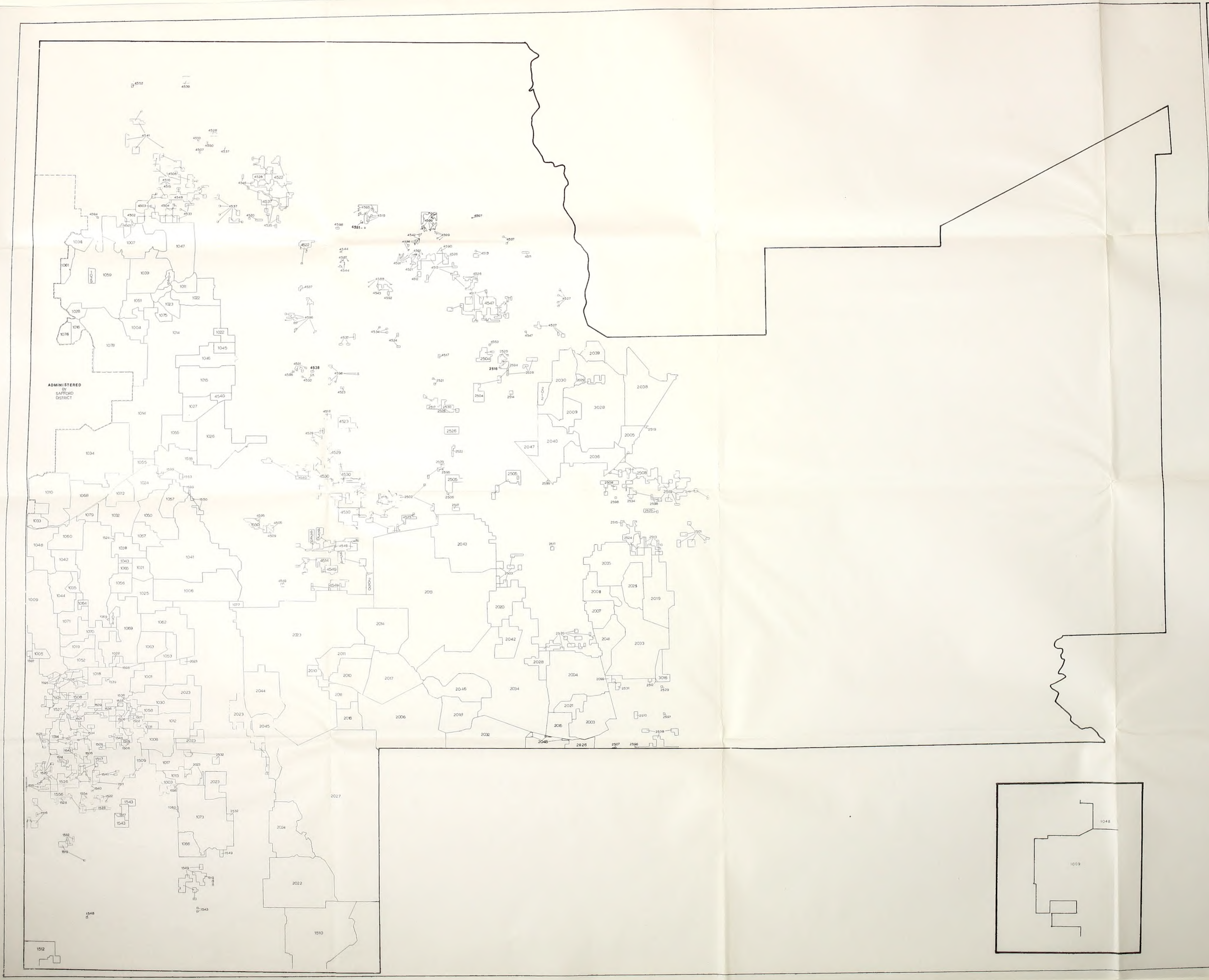
LEGEND:
LAND STATUS

- ■ Resource Area Boundary
- 🟨 Public Land
- 🟦 State Land
- 🟩 Forest
- ☐ Private Land
- ▨ Power Site Reserves, Water Power Designation, San Carlos Indian Irrigation Project
- —··—·· Grants

NOTE TO USER: This Visual is NOT for Legal Purposes.
This map shows only general ownership status and is subject to periodic change.

SOURCE: BLM Las Cruces District Files, 1982.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1983 — 677-530



UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

LAS CRUCES DISTRICT OFFICE LAS CRUCES, NEW MEXICO

LAS CRUCES / LORDSBURG RESOURCE AREA

OVERLAY 1

ALLOTMENT BOUNDRIES

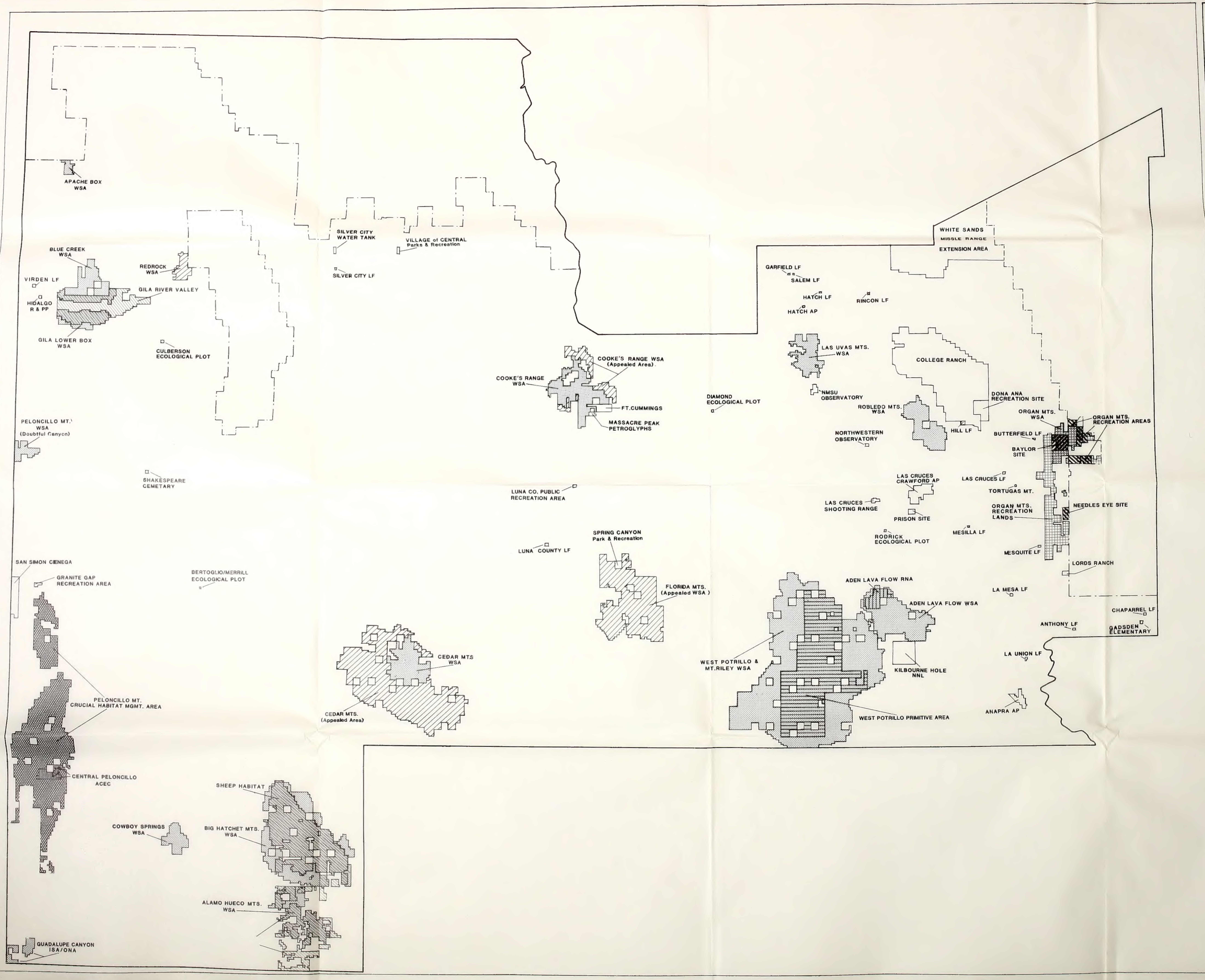
LEGEND

— ALLOTMENT BOUNDARY

2007 ALLOTMENT NUMBER

SOURCE: BLM Las Cruces District Files

Library
Bldg. 50, Denver Federal Center
Denver, CO 80225


APACHE BOX WSA
SILVER CITY WATER TANK
VILLAGE of CENTRAL Parks & Recreation
SILVER CITY LF
BLUE CREEK WSA
REDROCK WSA
VIRDEN LF
HIDALGO R & PP
GILA RIVER VALLEY
GILA LOWER BOX WSA
CULBERSON ECOLOGICAL PLOT
COOKE'S RANGE WSA (Appealed Area)
COOKE'S RANGE WSA
FT.CUMMINGS
MASSACRE PEAK PETROGLYPHS
PELONCILLO MT. WSA (Doubtful Canyon)
SHAKESPEARE CEMETARY
LUNA CO. PUBLIC RECREATION AREA
LUNA COUNTY LF
SPRING CANYON Park & Recreation
FLORIDA MTS. (Appealed WSA)
SAN SIMON CIENEGA
GRANITE GAP RECREATION AREA
BERTOGLIO/MERRILL ECOLOGICAL PLOT
CEDAR MTS WSA
CEDAR MTS. (Appealed Area)
PELONCILLO MT. CRUCIAL HABITAT MGMT. AREA
CENTRAL PELONCILLO ACEC
SHEEP HABITAT
COWBOY SPRINGS WSA
BIG HATCHET MTS. WSA
ALAMO HUECO MTS. WSA
GUADALUPE CANYON ISA/ONA
WHITE SANDS MISSLE RANGE EXTENSION AREA
GARFIELD LF
SALEM LF
HATCH LF
RINCON LF
HATCH AP
LAS UVAS MTS. WSA
COLLEGE RANCH
NMSU OBSERVATORY
DIAMOND ECOLOGICAL PLOT
DONA ANA RECREATION SITE
ROBLEDO MTS. WSA
ORGAN MTS. WSA
ORGAN MTS. RECREATION AREAS
HILL LF
BUTTERFIELD LF
NORTHWESTERN OBSERVATORY
BAYLOR SITE
LAS CRUCES CRAWFORD AP
LAS CRUCES LF
TORTUGAS MT.
LAS CRUCES SHOOTING RANGE
ORGAN MTS. RECREATION LANDS
NEEDLES EYE SITE
PRISON SITE
RODRICK ECOLOGICAL PLOT
MESILLA LF
MESQUITE LF
LORDS RANCH
ADEN LAVA FLOW RNA
ADEN LAVA FLOW WSA
LA MESA LF
CHAPARREL LF
ANTHONY LF
GADSDEN ELEMENTARY
WEST POTRILLO & MT.RILEY WSA
KILBOURNE HOLE NNL
LA UNION LF
ANAPRA AP
WEST POTRILLO PRIMITIVE AREA

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

LAS CRUCES DISTRICT OFFICE LAS CRUCES, NEW MEXICO

OVERLAY 2

EXISTING SITUATION FOR ENERGY MINERALS LEASING

LEGEND

EXISTING SITUATION

▩ WILDERNESS STUDY AREA (WSA)

▨ WSA APPEALED AREA

▤ PRIMITIVE AREA

▨ SPECIAL HABITAT AREA

▧ ORGAN MTS. RECREATION AREAS

▦ ORGAN MTS. RECREATION LANDS

▨ BAYLOR SITE

▥ ACEC

▩ CRUCIAL HABITAT MANAGEMENT AREA

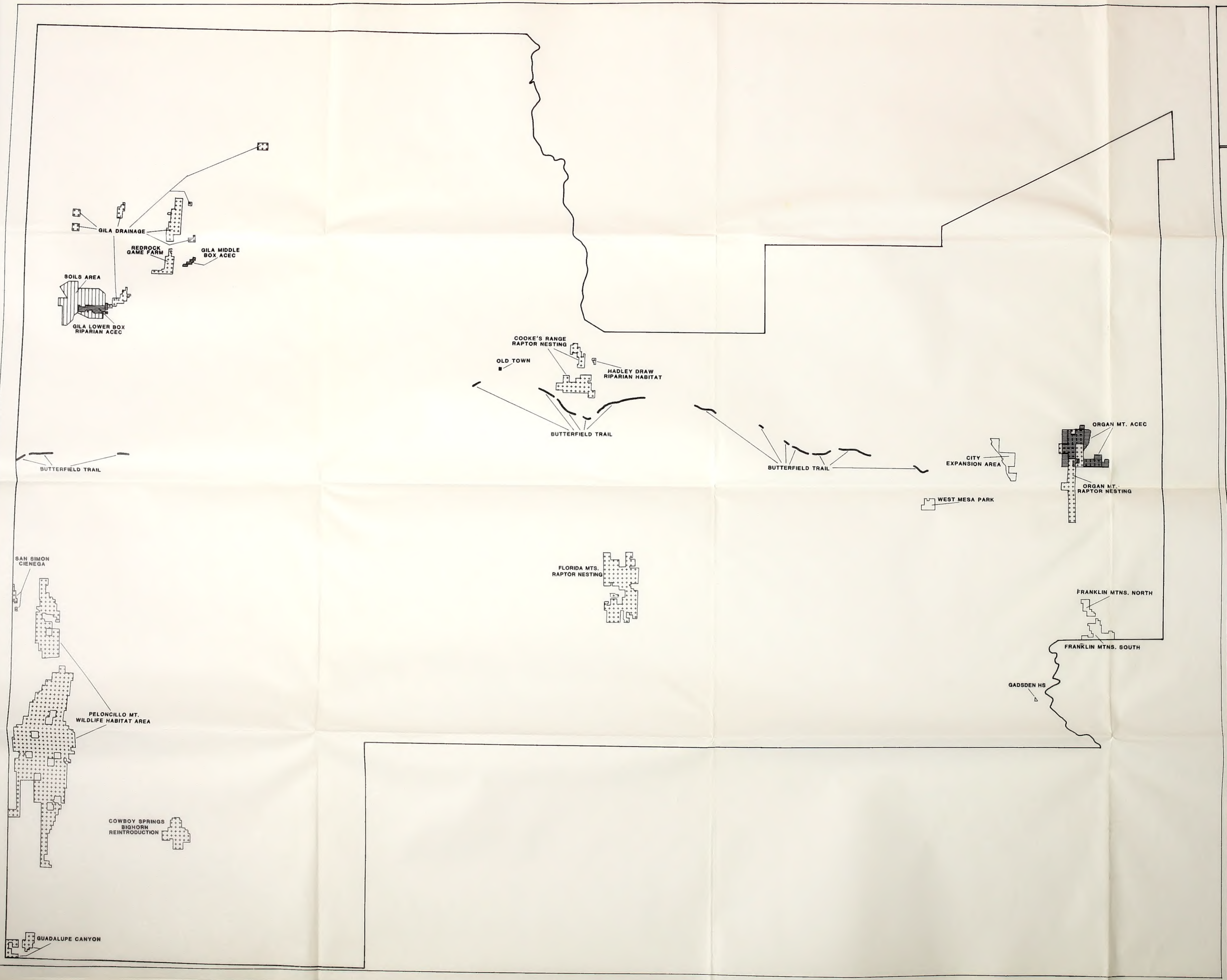
☐ OTHER

LF LANDFILL

AP AIRPORT

SOURCE BLM Las Cruces District Files 1982

Bureau of Land Management
Library
50, Denver Federal Center
Denver, CO 80225


GILA DRAINAGE
REDROCK GAME FARM
GILA MIDDLE BOX ACEC
SOILS AREA
GILA LOWER BOX RIPARIAN ACEC
COOKE'S RANGE RAPTOR NESTING
OLD TOWN
HADLEY DRAW RIPARIAN HABITAT
BUTTERFIELD TRAIL
BUTTERFIELD TRAIL
BUTTERFIELD TRAIL
CITY EXPANSION AREA
ORGAN MT. ACEC
ORGAN MT. RAPTOR NESTING
WEST MESA PARK
SAN SIMON CIENEGA
FLORIDA MTS. RAPTOR NESTING
FRANKLIN MTNS. NORTH
FRANKLIN MTNS. SOUTH
GADSDEN HS
PELONCILLO MT. WILDLIFE HABITAT AREA
COWBOY SPRINGS BIGHORN REINTRODUCTION
GUADALUPE CANYON

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

LAS CRUCES DISTRICT OFFICE LAS CRUCES, NEW MEXICO

LAS CRUCES / LORDSBURG RESOURCE AREA

OVERLAY 3

PROPOSED SITUATION FOR ENERGY MINERALS LEASING

LEGEND

PROPOSED PROJECTS

⊞ WILDLIFE PROJECTS

▤ ACEC

▥ SOILS AREA

■ ARCHAEOLOGICAL

☐ OTHER

— BUTTERFIELD TRAIL with 1/4 mile buffer on each side

SOURCE: BLM Las Cruces District Files,1982

ureau of Land Management
ibrary
ldg 50 Denver Federal Center
Denver, CO 80225

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
P.O. Box 1420
Las Cruces,New Mexico 88004

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES PAID
DEPARTMENT OF THE INTERIOR
INT 415

U.S.MAIL